

NETWORKWORLD

THE CONNECTED ENTERPRISE

DEC. 6, 2010

Is a next-generation firewall in your future?

Application-aware firewall/VPN with intrusion prevention and filtering on the rise

BY ELLEN MESSMER

THE TRADITIONAL port-based enterprise firewall, now looking less like a guard and more like a pit stop for Internet applications racing in through ports 80 and 443, is slowly losing out to a new generation of brawny, fast, intelligent firewalls.

The term "next-generation firewall" (NGFW) is used to describe an enterprise firewall/VPN that has the muscle to efficiently perform

intrusion-prevention sweeps of traffic and has an awareness of the applications moving through in order to enforce identity-based application usage. It's also supposed to have the brains to use information such as Internet reputation analysis to help with malware filtering or integrate with Active Directory.

But how long will it take for the NGFW transition to truly arrive?

Start-up Palo Alto Networks is regarded as the first vendor to have donned the NGFW

mantle. It introduced its line of multipurpose application-aware security appliances in 2007 and today has more than 2,200 customers. Vendors Fortinet, Cisco, Check Point, McAfee and Barracuda Networks, among others, have also been expanding or retooling their firewall products to fit the NGFW image. In addition, intrusion-prevention system vendor Sourcefire has said it will have an application-aware firewall with IPS out next year. But despite

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CLEAR CHOICE TEST
NETWORK-ATTACHED STORAGE

Best NAS boxes for less than \$1,000



Eight desktop devices that deliver terabytes of shared storage and more.

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Open source IP PBX saves serious cash for Michigan CAT

BY TIM GREENE

IN A move that might send shivers down the spines of mainstream IP PBX vendors such as Avaya, Cisco and ShoreTel, Michigan CAT has deployed an open source Asterisk IP PBX to handle its phone calls and contact center at half the cost of what commercial vendors would have charged.

Even the CIO in charge of the decision was a little nervous about whether the free software could support 300 phones

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ALSO INSIDE

What's in your network?

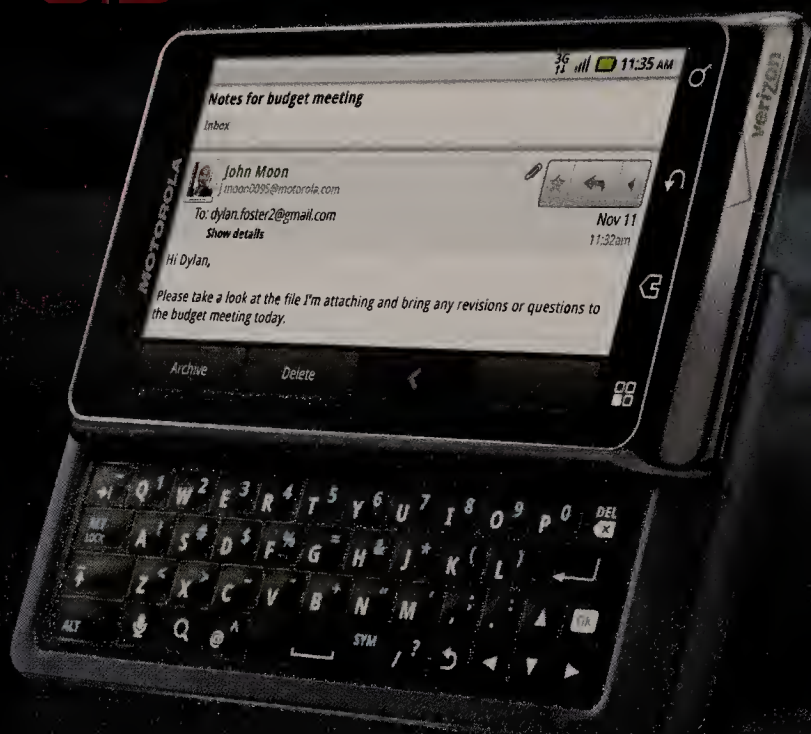
IPsonar makes quick work of documenting the nooks and crannies of enterprise nets. ► Page 38



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See back cover



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Enterprise Security



Device Management

Google Apps

To see the full range of Motorola business ready smartphones, visit Motorola.com/Business-Smartphones

Screen images simulated.

* Via over-the-air update coming in Q1 2011.

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Google

FROM THE EDITOR | JOHN DIX

Our vote on neutrality

The net neutrality framework that FCC chairman Julius Genachowski outlined in a speech last week and which will be voted on later this month sustains many of the original goals of neutrality while giving the telcos enough to give a tentative nod of approval, all of which adds up to a meaningful step forward.

While it is still unclear if the FCC has the legal authority to pursue net neutrality (earlier this year a court told the Commission it overstepped its bounds when it told Comcast not to throttle peer-to-peer traffic), thankfully all discussion about gaining that authority by reclassifying broadband as Title II telecommunications service has evaporated.

That would have been a messy, litigious affair that would have stalled progress for years. Genachowski says he is now convinced "we have a sound legal basis" for moving forward, but we won't know for sure until the approach is outlined in detail.

Here's what we do know: The framework — the FCC's effort to "preserve the freedom and openness of the Internet" by ensuring traffic on the net is treated in a neutral fashion and service providers don't try to enrich themselves at the expense of others — would require "meaningful transparency" so consumers know what service providers are doing; "prohibit the blocking of lawful content, apps, services"; and ensure a level playing field by including "a bar on unreasonable discrimination in transmitting lawful network traffic."

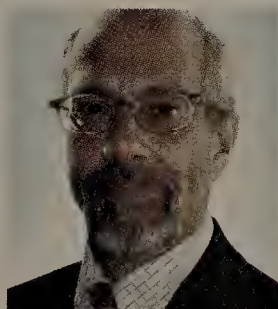
That is in keeping with the goals from the beginning. Here's the new stuff the telcos like: "Broadband providers need meaningful flexibility to manage their networks... to deal with traffic that's harmful... and to address the effects of congestion."

Service providers, many of them saying they still don't think any new rules are needed, were at least pleased by the concessions. AT&T: "The FCC appears to be embracing a compromise solution." Comcast: "The proposal as described... strikes a workable balance." Only Verizon blanched, as quoted in *The New York Times*: "The FCC's authority to act in this area is uncertain." Verizon sees the framework as a stopgap until Congress can pick up the issue.

Indeed, some congressmen are promising just that. According to *The Washington Times*, Tennessee Republican Rep. Marsha Blackburn, "is pushing a bill that would give Congress sole oversight of the Internet."

Besides that being a horrible idea given the ponderous, often misguided nature of Congress when it comes to all things tech, we don't believe lawmakers would have the stomach for it. After all, some of the biggest names in Internet innovation — Google, Netflix, Skype, eBay, Yahoo — are for the neutrality that Blackburn and others decry.

Although three of the five members of the FCC have generally favored neutrality, some don't think this framework goes far enough, so it will be interesting to see if Genachowski can muster the votes later this month. For our part, we like what we see. It is a tenable compromise.



John A. Dix

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WikiLeaks - the enemy of corruption, hypocrisy and evil

🔗 WIKILEAKS IS THE Samizdat of our generation - it stands for freedom of information, and the holding to accountability of all those who strive for a Big Brother form of absolute control — like the US Government (re: “Amazon reportedly shows WikiLeaks the door;” tinyurl.com/37yrd8o).

WikiLeaks shines a light into all those dark, corrupt and evil places in the world, where those who crave power do so at the expense of human lives and dignity. It helps expose those cockroaches, those vampire squids of humanity in the act of committing their horrible crimes. It helps to expose hypocrisy and moral hazard, to expose wrongdoings swept under the rug, to expose people in power acting in their own self-interest.

Granted, what WikiLeaks does may not be ethical, but not only is it moral, it is also necessary. Very necessary. If I had the money, I would buy the entire Amazon cloud network to dedicate it to WikiLeaks.

Remember this:

“They came first for the Communists, and I didn’t speak up because I wasn’t a Communist.

Then they came for the trade unionists, and I didn’t speak up because I wasn’t a trade unionist.

Then they came for the Jews, and I didn’t speak up because I wasn’t a Jew.

Then they came for me and by that time no one was left to speak up.”

WikiLeaks is speaking up. It is time we listened, and added our voice to theirs.

René Kabis

Last week, the Department of Homeland Security (DHS) seized the domain names of roughly 70 Web sites for copyright infringement. There were no warrants, no court orders, and no court hearings before a judge. The DHS simply used their authority to grab Web sites on the basis they are perceived threats.

So, if WikiLeaks is really exposing dangerous classified diplomatic cables that are a threat to the United States, why didn’t DHS seize the WikiLeaks domain? Assange was dropping hints of a major leak to come.

If WikiLeaks was a real whistleblower, DHS could shut them down by grabbing

their domain name just as easily as it shut down the copyright violators. But they didn’t.

There is no other possible explanation for DHS not to seize the domain as a real threat, especially since Assange was not shy about dropping hints as to what was to come!

WikiLeaks is a propaganda front.

Anon

Yet again another writer has nothing of value to write about

so he flaunts his ridiculous take on this matter. (Re: “WikiLeaks is not the actual problem;” tinyurl.com/35df3qz)

Plain and simple, WikiLeaks’ owner is another one of these morons that believe everyone has the right to know everything. The receipt of the leaked documents should have been met with responsibility in turning the analyst in to authorities and returning the materials stolen. Instead, in his lust for fame and fortune, the WikiLeaks owner publishes the materials not giving one hoot what the consequences may be for any and all involved.

Boogeyman

Duh

🔗 MICROSOFT IS AFRAID of Linux (re: “The Linux Desktop Revolution is Dead;” tinyurl.com/35em7p7). So what do they know? How about Linux is more stable using less resources with better security and unbeatable value with more frequent innovation. Google is arguably the most used service in the world and is run on the largest Linux networks ever made. Red Hat is a billion-dollar company. Look past Microsoft’s monopoly and watch it slowly but surely erode.

Anon

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WHAT'S *the* BUSINESS PROBLEM?

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FALLING SHORT ON COMPLIANCE

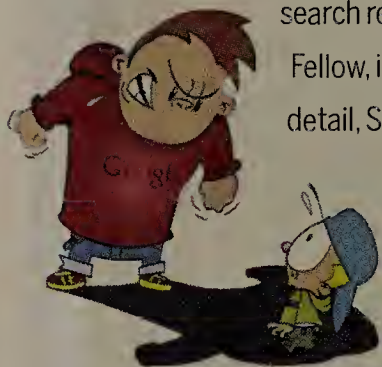
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Google one-ups online bully

IN AN UNCHARACTERISTICALLY public way, Google has acknowledged it modified its search algorithm so it can identify businesses that provide bad service and lower their rankings accordingly. Google took action after Vitaly Borker, founder and owner of online eyewear merchant DecorMyEyes, boasted that his site's high Google rankings were directly proportional to the many complaints posted by upset customers — and that he purposefully antagonized customers. That tactic won't work anymore, Google says. "I am here to tell you that being bad is, and hopefully will always be, bad for business in Google's

search results," wrote Amit Singhal, Google Fellow, in a blog post. Without going into much detail, Singhal said Google developed a solution that flags merchants that provide "an extremely poor user experience" and assigns them lower rankings. tinyurl.com/2wduogu



Cisco buys LineSider for cloud boost

THE ACQUISITION of LineSider, a small Massachusetts software company, fills a vital piece in one of Cisco's three strategic pillars: virtualization. LineSider makes network provisioning software for virtual data centers and clouds, delegating and enforcing policies among VMs and physical assets. Tuning the LineSider OverDrive software for Cisco routers and switches will allow the tools to control network access, security and services across logical and physical constructs. Cisco won't

say what it will pay for LineSider, but the cloud orchestration it is acquiring is significant as Cisco continues its transformation into a full-fledged IT supplier. LineSider will be integrated into Cisco's Network Management Technology Group under Jesper Andersen. tinyurl.com/35ee8x7

Women desire iPhones, men want Androids

IPHONES ARE especially popular among women while men prefer Android-based devices. This is according to

market watcher Nielsen's latest numbers, which show that about one in three U.S. wireless phone subscribers now own a full-fledged smartphone. Among 9,200 people surveyed, about 31% of women want an iPhone and about 23% want an Android phone, with BlackBerry and Windows phones coming next. Men leaned toward Android (32.6%) over the iPhone (28.6%). A separate survey earlier this year found that women were more likely to date a man, regardless of his looks, if he had an iPhone.

tinyurl.com/353or7e

IT VIDEO

Verizon 4G LTE first look

Keith Shaw gives a video demo of the LG VL600 USB data modem, which can access Verizon Wireless' new 4G LTE wireless network. In speed tests, he was able to achieve about 6M to 8Mbps of download speed, and almost the same (5M to 7Mbps) of upload speeds. tinyurl.com/234ofbo

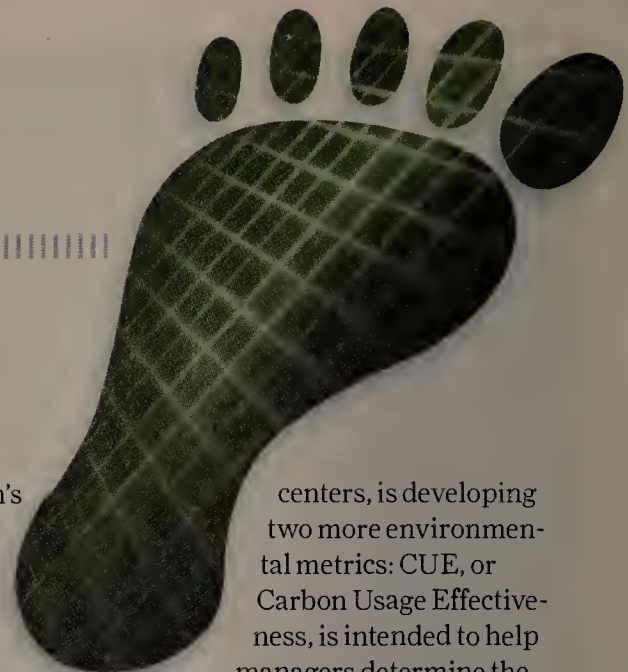
Getting a handle on IT's carbon footprint

THE GREEN Grid consortium, which developed the widely used PUE metric for measuring energy efficiency in data

centers, is developing two more environmental metrics: CUE, or Carbon Usage Effectiveness, is intended to help managers determine the amount of greenhouse gas emissions generated by the IT gear; while WUE, or Water Usage Effectiveness, is intended to show how much water is consumed by IT operations. The CUE metric is available today, and the WUE metric will be posted by March 2011. tinyurl.com/34hh6jh

Google trumps Microsoft, lands GSA cloud deal

THE U.S. General Services Administration will become the first federal agency to use a cloud-based system for e-mail across the entire agency, choosing Google, Unisys and others for a five-year, \$6.7 million deal. GSA expects to reduce existing costs by 50% over the term of the deal. The choice is a blow to Microsoft, which has tried to position itself as offering the most secure services for the government. Earlier this year Microsoft launched a version of its Business Productivity Online Suite that includes Exchange, SharePoint, Office Live Meeting and Office Communications hosted from special facilities to meet the needs of federal agencies. Physical access to the site is controlled with biometric systems and the only people with access to the facility are U.S. citizens, Microsoft said. Google has also made efforts to appeal to government customers. In July, it introduced Google Apps for Government, including Gmail, Talk, Groups, Calendar, Docs, Sites, Video and Postini. Data is stored only in the U.S., and servers that support the offering are segregated from



WASTED HOURS TIME CARD

Name _____ Date _____

Current Security Company _____

# OF HRS. SPENT	SUN	MON	TUE	WED	THU	FRI	SAT	TOTAL
DOWNLOADING LATEST PATCHES								
DOWNLOADING PATCHES FOR LATEST PATCHES								
LOOKING FOR UPDATES								
CONSOLING COWORKERS WITH CRASHED COMPUTERS								
FIXING PREVENTABLE PROBLEMS THAT WEREN'T PREVENTED								
TOTAL HOURS:								

X _____

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It may not seem like a revolutionary idea, but in the security industry it is. It has somehow become the norm to pass the burden of security from company to customer. Installing, maintaining, downloading, and updating is somehow your job, while finger pointing, blaming, and looking the other way is theirs. Well, at Webroot we think it's time for a change. It's time for security to be the service it is sold as, instead of the burden it becomes. It's time to prevent problems instead of scrambling to fix them. It's time for Webroot.

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GOOD BAD UGLY

Do you feel like you're being followed?

U.S. WEB users should be able to sign up for a do-not-track list that would prohibit Web sites and advertising networks from following their movements online,



according to the Federal Trade Commission.

The do-not-track list would help consumers better protect their privacy because a uniform mechanism for opting out of online tracking does not yet exist, the FTC said in an online privacy report released last week. The do-not-track list could be implemented by the Internet industry or by Congress, the FTC said.

The report shows a failure of private industry to adequately address customer privacy concerns online, FTC Chairman Jon Leibowitz said during a press conference. "Despite some good actors, self-regulation of privacy has not worked adequately and is not working adequately for American consumers," he said.

Another Sputnik moment for the U.S.

U.S. SECRETARY of Energy Steven Chu said last week during a National Press Club speech that the United States is at risk of losing its worldwide leadership in technology, especially in clean energy development.

Chu cited many numbers to make his case — and invoked comparisons to the Soviets beating the U.S. to the punch with the Sputnik 1 satellite. The secretary noted, for instance, that the U.S. has let slip its 25% share of technology exports in 1998 to about half that now. Chu said the issue can be addressed via more investment and new government policies.

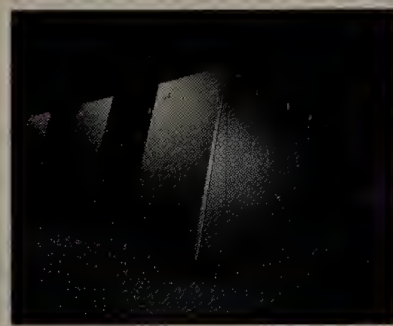
RIM takes another kick at Kik

RESEARCH IN Motion last week filed a patent infringement lawsuit against Kik, a Canadian company that makes an instant messaging app that works across BlackBerries as well as Android and Apple phones.

RIM earlier had kicked Kik out of the BlackBerry App World app store for an alleged breach of contract and cut off Kik from RIM's BlackBerry development tools. Kik's apps have gained a big following in a hurry, with some 2.5 million users since launching in October.

those used by nongovernmental customers. tinyurl.com/33fpje4

Breakthrough may lead to exascale supercomputers

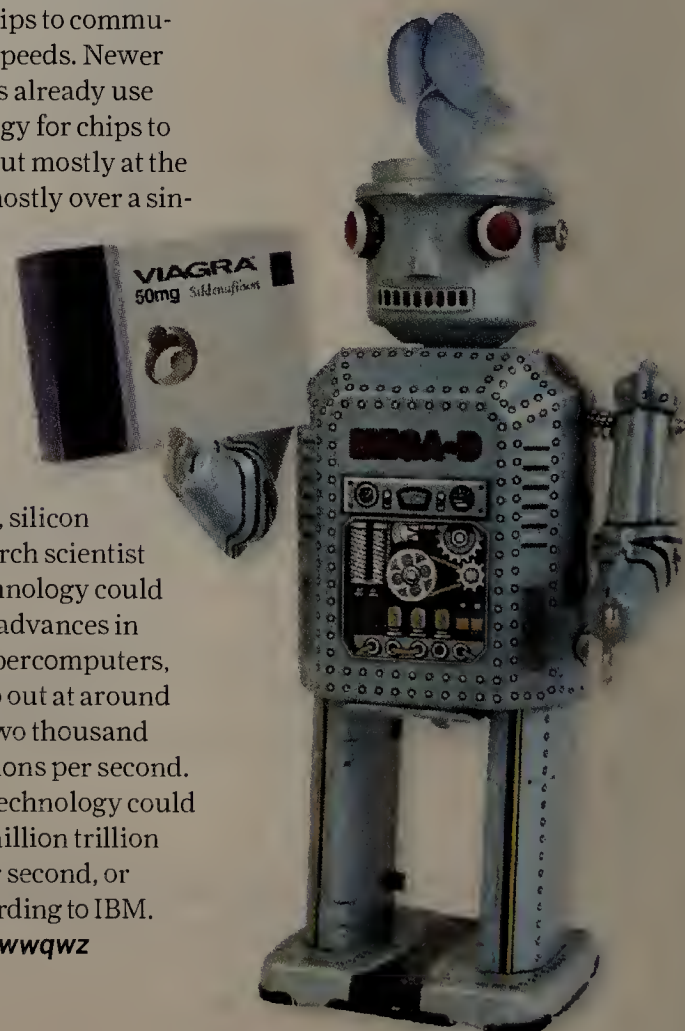


IBM RESEARCHERS have made a breakthrough in using pulses of light to accelerate data transfer between chips, which could boost the performance of supercomputers by more than a thousand times. The new technology, called CMOS Integrated Silicon Nanophotonics, integrates electrical and optical modules on a single piece of silicon, allowing electrical signals created at the transistor level to be converted into pulses of light and allowing chips to communicate at faster speeds. Newer supercomputers already use optical technology for chips to communicate, but mostly at the rack level and mostly over a single wavelength. IBM's breakthrough will enable optical communication simultaneously at multiple wavelengths, said Will Green, silicon photonics research scientist at IBM. The technology could lead to massive advances in the power of supercomputers, which today top out at around 2 petaflops, or two thousand trillion calculations per second. The photonics technology could boost that to a million trillion calculations per second, or an exaflop, according to IBM. tinyurl.com/34wwqwz

Feds draw bead on Russian behind botnet

AN INTERNET ring hawking counterfeit male-enhancement remedies, phony Rolexes and generic pills with false FDA approval has led the FBI to a Russian believed to be behind the Mega-D botnet, which earlier this year accounted for one in 10 spam messages sent on the Internet. Members of the Affking ring told investigators they hired a Russian spammer to distribute e-mail advertisement for their suspect wares, and backtracking through chat logs and e-commerce records yielded the name of Oleg Nikolaenko, 23, of Moscow. An Affking member reportedly paid Nikolaenko \$459,098 between June 4 and Dec. 5 2007, indicating the scale of profits to be made from the botnet. It is unclear whether Nikolaenko ran Mega-D or whether he just leases bots from the actual controllers. A year ago, security firm FireEye took down the Mega-D botnet but it rebounded.

tinyurl.com/32hkyua



good

bad

ugly

Managing smartphones calls for new realism

BY JOHN COX

THE SMARTPHONE'S impact on the enterprise can be seen in a small bank in Needham, Mass., where its full-time staff of 95 forms a mobility microcosm. Today, over one quarter of them are using Apple iPhones and more recently iPad tablets, where once they used Microsoft Windows Mobile phones.

"Apple met the minimum requirements to make [the iOS operating system] enterprise-friendly for me," says James Gordon, Needham Bank's vice president of IT. For the bank, that means support for Microsoft Enterprise ActiveSync to connect users with Exchange Server e-mail, calendars and contacts, and to support a range of basic management features as well as on-device encryption.

The mobile users can connect remotely and securely to their Windows desktop PCs via Array Networks' DesktopDirect application and appliance, and often do so from inside the bank's headquarters or one of its five branches. One bank executive was using this connection to type Exchange e-mails with his iPad's onscreen keyboard while almost within arm's reach of his desktop keyboard, Gordon recalls.

"In the past, we had Windows Mobile devices," Gordon says. "But I dumped them as soon as I could and ate the early-termination fees." Laptops, long the staple mobile computing platform for the enterprise, are a non-starter at the bank. "For as mobile as we are, very few people use laptops," Gordon says. "And when they do, they pray, 'Please, God, let this work.'"

His comment highlights the dramatic changes occurring in enterprise mobility, confirmed by data from a new enterprise IT survey by Aberdeen Group (see chart). Companies are embracing smartphones with modern mobile operating systems like Apple iOS and Google Android, despite the fact that both lack the traditional server-based support infrastructures of RIM's BlackBerry operating system and Microsoft's Windows Mobile. Another change is that more companies now are willing to let employee-owned smartphones have at least some access to corporate networks and data.

Managing smartphone mobility requires a new realism about what can and can't be done. Done badly, smartphone deployments can result in "increased security risk, growing

usage costs and diminished information technology (IT) control," wrote Paul DeBeasi, a research director at Gartner, in a July report titled "Evaluation Criteria for Smartphone Mobile Device Management."

Today, he notes, mobile device management (MDM) is a bewildering collection of

access to Exchange e-mail and personal information manager data, Gordon says. "They'll be expanding functionality and usability over time." In many cases, at least to start, these companies are relying on the combination of policies and capabilities in Exchange and Microsoft Enterprise ActiveSync for iOS management and security.

DeBeasi identifies five broad "evaluation categories" when considering MDM products:

- The level of control required over applications installed on the smartphone.
- Security features such as authentication mechanism (including password control and enforcement), encryption and remote data wipe.
- Defining and enforcing mobile policies for groups of mobile users.
- Support for the specific operating systems and devices being used, including operating system updates and removable media such as SD cards.
- Help desk and technical support capabilities to troubleshoot mobile problems.

These criteria are a way to identify the key differences not just in third-party products, but also in the underlying mobile operating systems. The management capabilities offered in Apple iOS 4.2, Android 2.2, and the initial release of Windows Phone 7 vary widely.

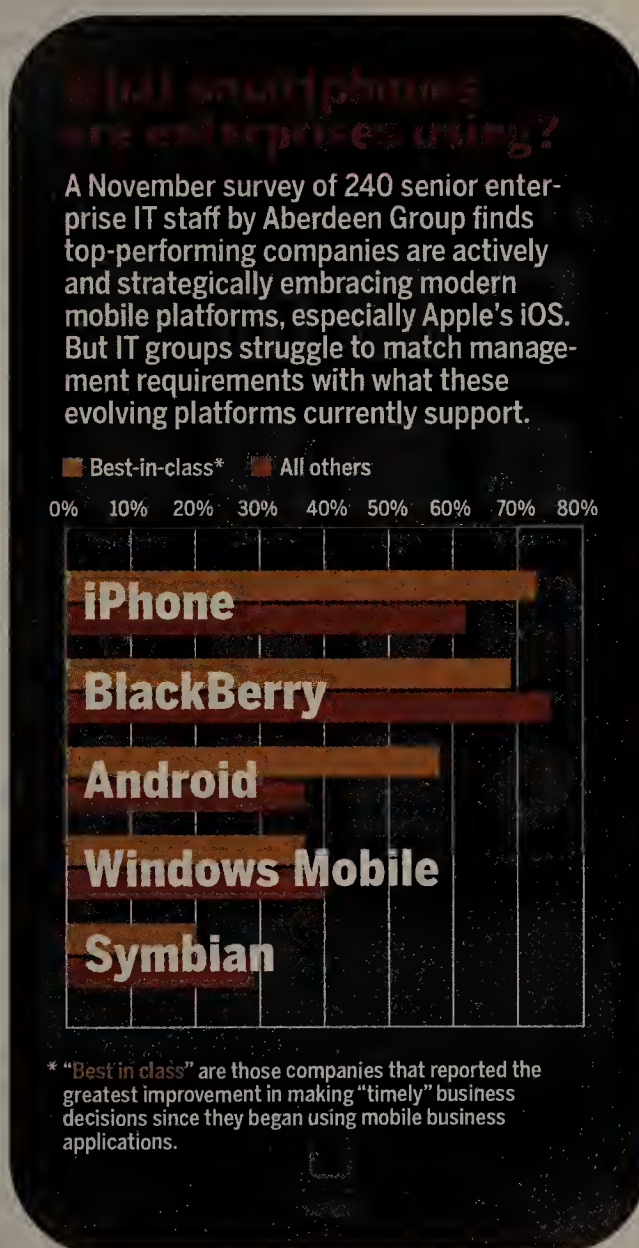
Different requirements mean IT groups may have to support different platforms with different capabilities for different groups of users.

Of Android, iOS and Windows Phone 7, iOS is the most mature. And that's reflected in some large-scale enterprise deployments such as RehabCare, a rehab services provider that has deployed nearly 9,000 iOS devices, most of them iPod Touches.

In iOS 4.0, Apple made available a set of device management APIs (and added file-based encryption), developed by working closely with MDM vendors such as MobileIron and Sybase (which offers the Afaria product). Other vendors include Absolute Software, AirWatch, BoxTone, TrustDigital and Zenprise. With the just-released 4.2 version, these APIs and additional management and security features are now available for enterprise iPads.

Apple's approach is to use an App Store download to set up a direct link between the iPhone and a server application from one of the

► See **Smartphone**, page 10



applications that often focus on very specific, very narrow issues, though many vendors are working toward products that take a comprehensive view of mobile management.

Many enterprises are aware of the relative immaturity of the new mobile platforms and deploy accordingly, says Jay Gordon, vice president of Enterprise Mobile, a Watertown, Mass., mobile integrator that is 70% owned by Microsoft. Nearly a dozen of its enterprise clients are deploying iOS devices, in numbers ranging from a few hundred to several thousand.

"They all plan on [initially] deploying iPhones in a fairly basic format," mainly for

Verizon sets the bar for future LTE launches

Offers 5GB, 10GB plans, charges \$10 per gigabyte overage

BY BRAD REED

VERIZON last week laid down some important markers that AT&T and T-Mobile will try to match or best when they launch their own LTE networks next year.

For starters, Verizon has set the bar pretty high in terms of initial 4G coverage. Whereas Sprint and Clearwire started rolling out their 4G WiMAX network in Baltimore and have spent the past two years launching 4G coverage on a city-by-city basis, Verizon is launching its LTE network in 38 major markets over the next month alone. Verizon estimates that its network in these markets will cover roughly one-third of the U.S. population and will also be available to travelers who are spending time at 60 airports around the country. The carrier plans to have its entire current 3G footprint upgraded to LTE by the end of 2013.

Verizon has also set high expectations in terms of data speeds. The carrier says users can expect between 5M and 12Mbps on the downlink and around 2Mbps on the uplink. Even if the network averages only 5Mbps on the downlink, it will be well in line with Sprint's WiMAX network, which averaged between 2.5M and 4Mbps at its inception. Verizon says latency on its LTE network will be half of what users currently experience on its 3G network.

In terms of plans and pricing, Verizon so far has committed to two capped data plans: a \$50-per-month plan that offers 5GB of data consumption, and an \$80-per-month plan that offers 10GB of data consumption. While users will be allowed to go over their monthly limits on both plans, Verizon says it's going to charge users \$10 per gigabyte of extra data consumed. Verizon Wireless CTO Tony Melone said the carrier will send users text alerts when they have reached certain monthly data thresholds and will alert them when they have consumed 50%, 75%, 90% and 100% of their monthly data allowance.

And finally, when it comes to devices, Verizon is initially offering only two different types of LTE USB modems for laptops. Both modems will cost about \$100 and will require signing a two-year contract. When asked if the company plans to offer any no-contract plans on its LTE network in the near future, Melone said he wasn't sure. He said Verizon will be announcing its first LTE-based smartphones this January at the Consumer Electronics Show in Las Vegas and

Verizon's LTE vs. Clearwire's WiMAX

A quick breakdown of what both services offer

	Clearwire	Verizon
Plans	\$45 for unlimited data	\$50 for 5GB a month, \$80 for 10GB a month
Speeds	Average speeds between 3M and 6Mbps	Average speeds between 5M and 12Mbps
Coverage	Over 68 markets, covering 120 million people	38 major U.S. markets by end of 2010, covering 110 million people
Third-party wholesalers?	Sprint, Time-Warner Cable, Comcast	None yet, although Verizon plans to have small rural carriers license its spectrum to reach places Verizon's LTE network can't

consumers could expect to see LTE phones hit the market by mid-2011 at the latest.

4G technologies such as LTE and WiMAX represent the next stage in the evolution of wireless data technologies and generally deliver average download rates of 3Mbps or higher. In contrast, today's 3G networks typically deliver average download speeds

about one-tenth that rate. Until today's Verizon LTE announcement, Sprint had been the only major carrier to offer 4G services in the United States; its WiMAX network has been up and running commercially for more than two years. Rival carriers T-Mobile and AT&T are expected to launch LTE networks of their own sometime next year. ■

► Smartphone, from page 9

vendors, says Jesse Lindeman, MobileIron's director of product management. Technically, the downloaded app has no other function, and the MDM server's capabilities are limited to what Apple has enabled in iOS, such as pushing a configuration change to the iPhone without involving the end user, or downloading native enterprise-built iOS apps.

But some vendors, such as MobileIron and Sybase, are adding support to their on-device clients to enable additional features, such as running tests to determine if the iPhone has been jailbroken (which lets it load applications outside of the App Store), or to make use of the phone's location information.

In contrast, Android 2.2 is not as advanced. It added support for Microsoft Exchange Server and lets IT set password policies on Android phones, remotely lock them and, if needed, reset them to factory defaults (thereby wiping them of data, but not data stored on an SD card). MobileIron, for example, issues a second command to erase the card.

"I don't see Google [yet] having the same approach as Apple in terms of the level of

study, collaboration and software development to address enterprise management and security," says Andrew Borg, a senior research analyst at Aberdeen.

Borg's ongoing surveys of enterprise IT groups confirm the rapid adoption of smartphone platforms. His most recent study reveals that those companies seeing the most dramatic measurable payback from smartphone mobility are those that are now rapidly developing a new style of application.

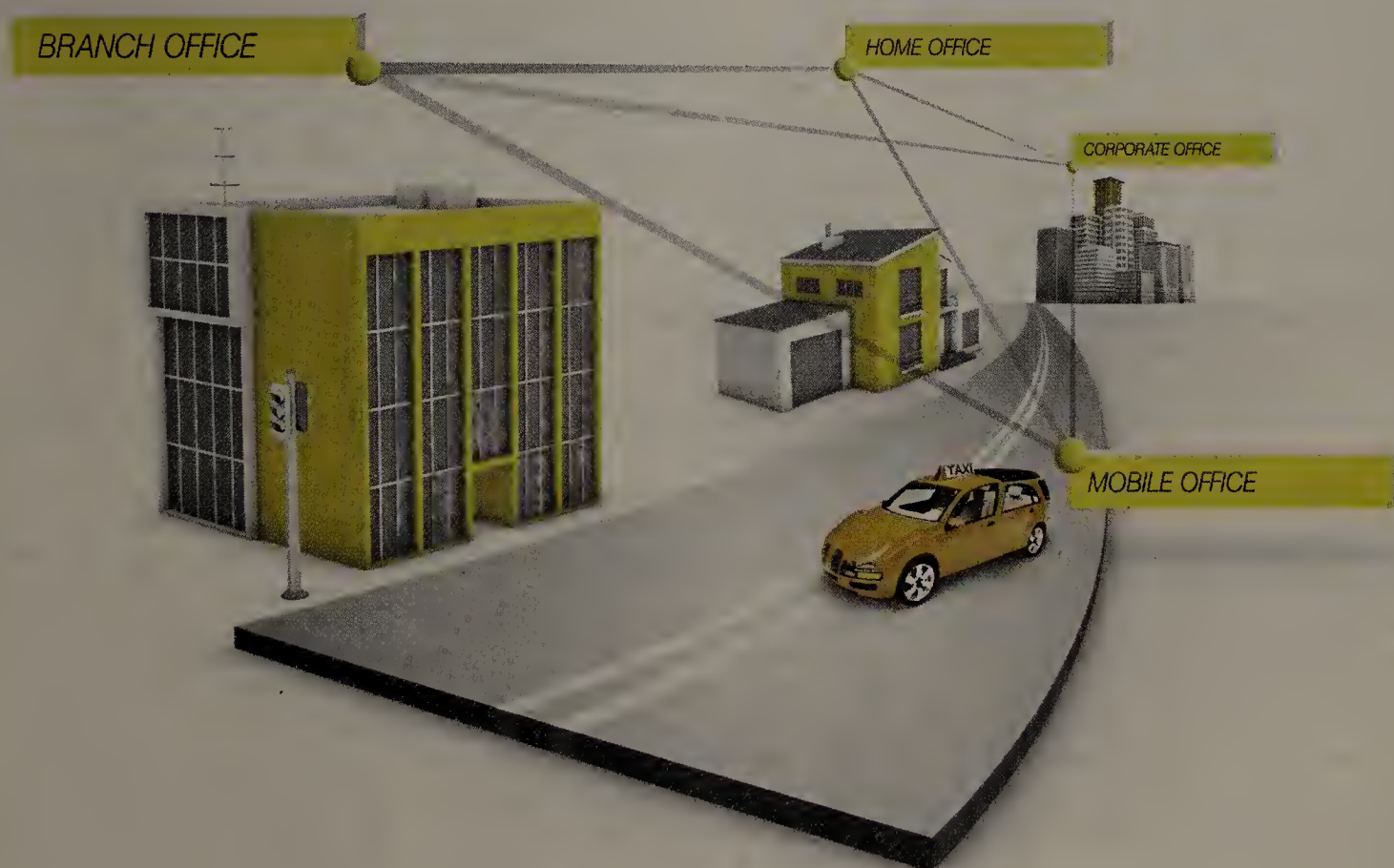
These are lightweight, simple, highly focused apps — of the type pioneered by the iPhone — which can pull data from wherever it resides and bring it to smartphone users, singly or in groups, to be used in quickly making critical business decisions.

The increasing importance of such mobile apps underscores the need for effectively managing these diverse and fast-changing deployments.

"It is impossible to provide identical levels of support for all users and all smartphone platform types," according to Gartner's DeBeasi. "Enterprises must put in place policies and procedures that enable the management of mobile diversity." ■

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► Firewall, from page 1

all of that activity, actual use of advanced firewalls today is still very low, according to Gartner which has promoted NGFW for the past few years.

"We believe that less than 1% of interconnections secured today are using NGFW," says Gartner analyst Greg Young. But he predicts that figure will hit 35% by 2014.

But NGFW — not quite a scientific term yet more than just pure marketing — remains unsettled. There have not yet been any independent third-party lab tests of so-called NGFW products, several vendors point out. ICSA Labs is discussing a possible NGFW test of various products, says Fortinet, but part of the challenge is nailing down a clear definition of what NGFW is. Gartner, which has its own definition of the term (see chart), is aware that "some vendors have application control and some are more advanced in IPS," says Young. "The majority of the enterprise firewall vendors are at the early stages of this. Palo Alto is dragging established vendors into it."

The terminology issue is further confused by the term Unified Threat Management (UTM), a phrase coined by IDC analyst Charles Kolodgy, who says that UTM has roughly the same meaning as NGFW. But Gartner argues that UTM should apply to security equipment used by small and mid-size businesses, while NGFW is supposed to be for large enterprises with 1,000 employees and up.

Despite this clash of idioms and the fact that there's only a tiny installed base of customers using what are presumed to be NGFW systems, security vendors do appear to recognize that demand for consolidated multipurpose enterprise security appliances is likely to rise.

"The market trends are moving in that direction," says Patrick Bedwell, vice president of product marketing at Fortinet, which last week announced the Fortigate-5001B security blade for its 5000 series appliance family. The Fortigate-5001B can reach up to 40Gbps — a big leap over its previous limit of 8Gbps. "Legacy firewalls can't keep up. The focus needs to be on application control as threats are getting more complex," says Bedwell.

The FortiGate firewall/VPN security blade is application-aware for about 1,300 applications and can establish granular controls on user behavior with applications, along with time frame limitations and bandwidth management.

Other vendors are joining the NGFW movement, too. McAfee, for example, says its Enterprise Firewall v. 8 is now an

NGFW, thanks to changes it made to the product last June.

"We reworked the application engine so we could detect and fully inspect over 1,000 applications," says Greg Brown, McAfee's director of network defense product marketing. "We made the engine extensible, and there are application updates each week."

McAfee Enterprise Firewall v. 8 reaches 10Gbps. But to head into higher speeds, McAfee partnered with Crossbeam Systems to be able to reach 40Gbps on their platform. McAfee is working to get higher speeds on its own appliances.

And does the "do-it-all, know-it-all" firewall really have an IPS function as effective as a stand-alone IPS? Brown acknowledges that it's hard to know, and that no independent tests for this have been done, but "the intention is to do as effective a job as a stand-alone IPS."

In comparison to a "conventional firewall" that mainly looks at IP network ranges, says Brown, the NGFW way of doing things in application control does represent a new technology for most customers.

There's appeal in using capabilities such as Microsoft Active Directory integration to set up user groups for authorized applications. So far, though, most McAfee customers are trying out advanced firewall features gingerly with some applications, not all, to see what impact policy controls have.

Health club chain 24 Hour Fitness, which has more than 400 clubs in the U.S. and abroad, deployed the Palo Alto Networks application-aware firewall last summer and is giving it a workout.

Justin Kwong, senior director of IT operations and security there, says there's not only a cost justification in switching to Palo Alto's consolidated architecture; he says his staff now gets a much better picture of what's happening using features such as reputation-based filtering.

The company is making use of Palo Alto's integration with Active Directory to set up policy controls regarding applications for employees, but the use is "not that granular yet," says Kwong, noting there's a learning curve regarding application control. In addition, Kwong doesn't believe his organization as yet needs to migrate completely to the NGFW model, since the need for application-aware controls may not exist in all parts of the network or data center.

IDC's Kolodgy says such attitudes toward application-based controls are to be expected. "Use it in limited use until you are comfortable with it and then expand its use, which is exactly how IDS transitioned into IPS," he advises.

In addition, although the NGFW represents

What is a 'Next Generation Firewall'?

Gartner's "must-have" NGFW definition includes the following points:

- It must have standard firewall features, such as network address translation, stateful inspection and VPN. And it must be suited for a large enterprise.
- The intrusion-prevention system must be "truly integrated" with the firewall.
- It must have an "application-awareness" capability to recognize applications and set controls.
- It must offer "extra-firewall" intelligence to bring in information to help make decisions. Examples include reputation analysis, integration with Active Directory, and blocking or vulnerability lists.

The term NGFW is one primarily formulated by Gartner, which advocates that the traditional enterprise firewall industry advance around the concept.

security consolidation, Kwong has some reservations about that. He says he also plans to continue using open-source IPS as "a second set of eyes" in addition to the Palo Alto IPS functionality. "I'll never consolidate everything in one box," says Kwong, adding "I'm never going to rely solely on one vendor."

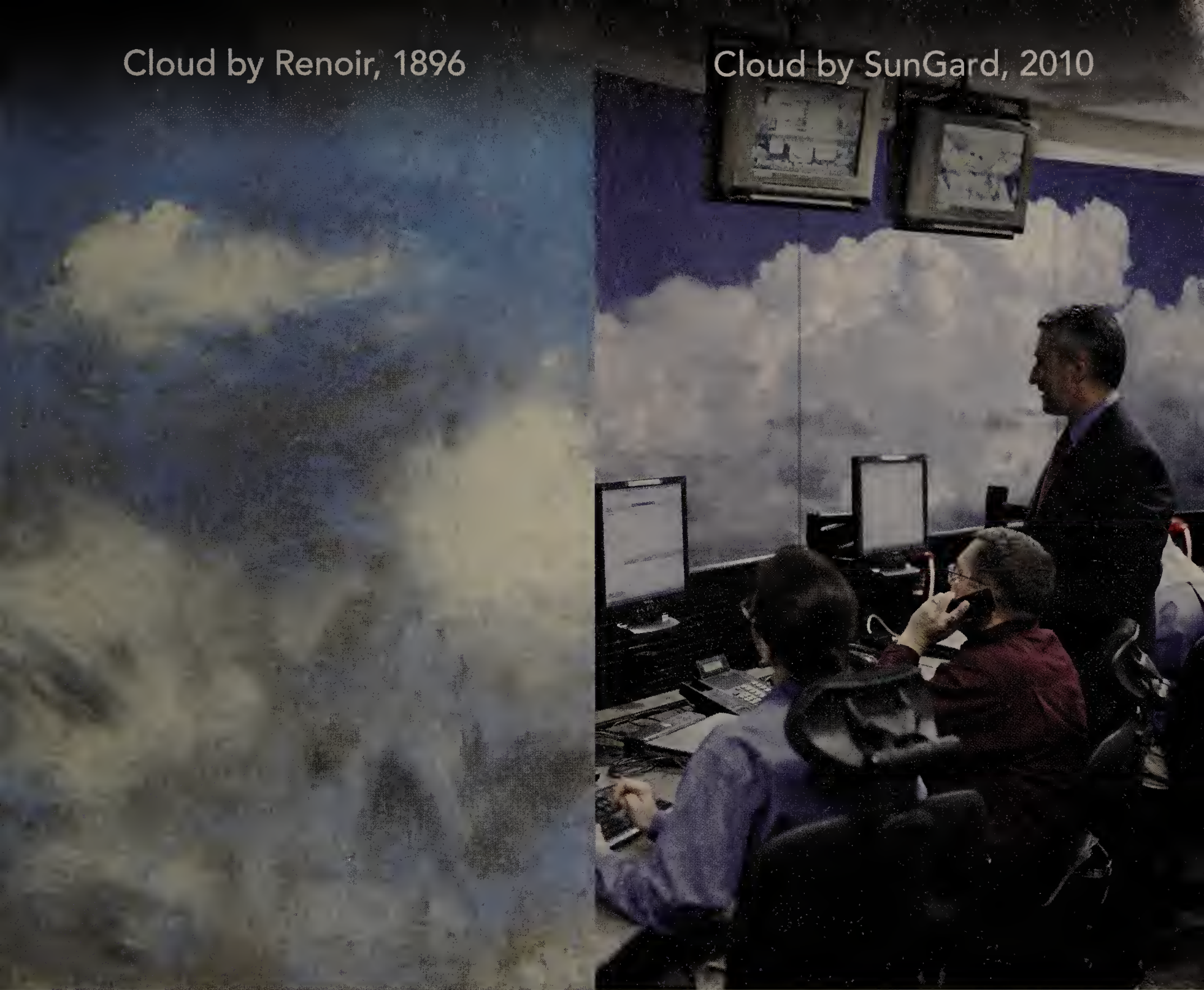
And what about the question of how any of the NGFW security applies when users aren't even behind a firewall, such as when they're travelling with a laptop or using a mobile device?

"We can expand to the user's machine not on the network," says Chris King, director of product marketing at Palo Alto Networks. The company already has a VPN client that can drag user traffic back to the customer's NGFW point, but early next year Palo Alto will offer what it calls a GlobalProtect smart VPN client, which will know where the user is in the world and will direct the client to the nearest gateway. "There's a hierarchy of gateways that manages a list of gateways, and the client knows where the nearest gateway is," King says. This capability enables some level of data-loss prevention, he adds.

Palo Alto also sees the ability to do SSL inspection as a big plus for its package, which opens up inbound and outbound traffic, based on a trusted environment where a user's desktop certificate is shared. "We'd open it to make sure it's an allowed application, then re-encrypt," King said. ■

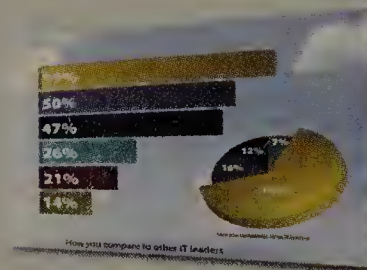
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SUNGARD AVAILABILITY SERVICES

R&D still a priority at Microsoft, HP and IBM labs

BY JAMES NICCOLAI, NANCY GOHRING AND JOAB JACKSON, IDG NEWS SERVICE

AT MICROSOFT, HP and IBM, investment in research and development is a reflection of corporate culture. HP prides itself on its pragmatism, while Microsoft holds the flag of basic research aloft — and IBM continues to file more patent applications, year after year, than any other tech company.

HP Labs

Inventing ways to do more with less

HP Labs has seen some big changes in the past few years. In 2007 it hired Prith Banerjee, the dean of engineering at the University of Illinois-Chicago, as its new director. A year later the labs started to narrow its focus from the 150 or so projects its scientists had been working on to 20 “big bets.”

The labs had lost its focus, with researchers squirreling away in small groups on projects that didn't always serve HP's wider goals. Banerjee calls the new approach “innovation with purpose.” He has arranged the big bets around eight broad areas that HP sees as core to its future, including analytics, data management, intelligent infrastructure, sustainability and, of course, the cloud.

Banerjee brushes off the criticism that HP Labs may be underfunded. Last fiscal year the company invested 2.5% of its total revenue in R&D, compared to 6.1% of revenue at IBM and 14% at Microsoft. That's still \$2.8 billion, however, of which the labs budget is only a fraction — in 2008 it was \$150 million. The vast majority is spent on later-stage development in HP's product groups.

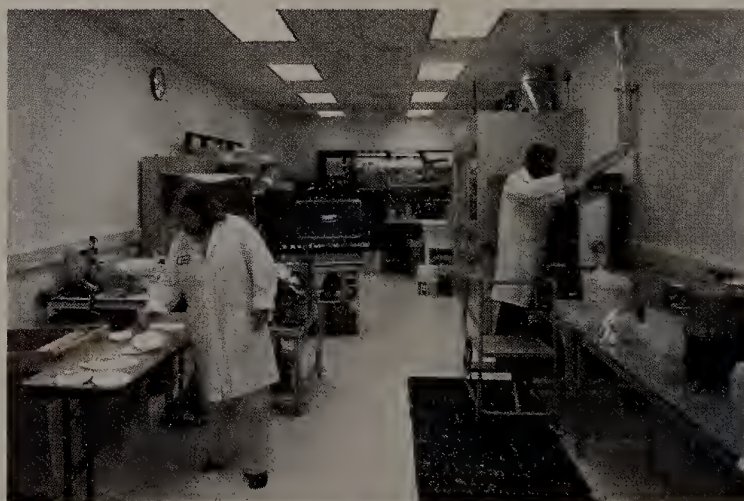
“People get all hung up on this percentage of revenue figure, but I could spend a ton of money doing completely useless research and development,” Banerjee says. “It's the research output that matters, not the amount of dollars you put in.”

Displays are one big focus for the company. HP doesn't manufacture displays, but it sells around 70 million of them each year in PCs, printers and other products. If it could come up with a radically cheaper way to make displays, HP could license the technology to others and also lower its own product costs, says Carl Taussig, director of HP's Information Surfaces Lab.

To do that it is trying to come up with a completely new manufacturing technique. Today, displays are produced essentially one at a time, using a photolithography technique

similar to that used for semiconductors. But Taussig and his team have been developing a “roll-to-roll” process that allows manufacturers to almost literally print circuitry onto screens one after the other.

The process could go into production for certain types of screens in as little as two to three years, he said. HP has custom-built machinery running in its labs that can “print” displays at 5 meters per minute from long sheets of a thin polymer material. HP's breakthrough was to invent an imprint lithography process that allows the circuits to be layered on top of each other on the flexible screens but still stay in perfect alignment, Taussig says.



HP research scientists Manoj Bhattacharyya and Laurie Mittelstadt finish work on a de-inking technology at HP's Commercial Print Engine lab.

LCDs cost about \$100 per square foot to produce today, and the roll-to-roll method could reduce that to \$10, he says.

Printing is another focus, but not the type found in homes and offices. Most of the optimization for those products has already been done, so the labs are focused instead on digital commercial printing presses, says Eric Hanson, director of HP's Commercial Print Engine Lab.

The labs have already developed a new type of ink for HP's Indigo digital press. Hanson wouldn't reveal anything about the newer presses HP is developing. But he was keen to show off a technology that could help smooth the industry's transition from analogue to digital printing, and thus eventually help HP to sell more equipment.

One obstacle for the industry is that paper mills don't have an efficient way to remove digital ink from all types of paper — something they need to do when they recycle

magazines and brochures to make new paper. So one member of Hanson's team, Hou Ng, has developed a “surfactant” that allows digital and other inks to be skimmed off in a foam after the pulping process.

HP plans to give away the formula so that other companies can produce the chemical, Ng says. The idea is remove any obstacles that could prevent the digital print market from expanding.

The labs' narrower focus doesn't mean it works only on projects tied to HP products. HP doesn't design its own server chips any more, for example, but it continues to invest in microelectronics. In August it announced a partnership with Hynix to commercialize a new memory technology called memresistor

that derives from work in HP Labs. The labs also contributed a video compression technology for HP's Halo and Skyline videoconferencing systems, and its on-demand magazine printing service, MagCloud began as an idea in HP labs.

Microsoft

Keeping the focus on pure research

Microsoft likes to boast that it's one of the few remaining public companies that still does pure research, including kinds that might not turn into products for many years.

“Many of the other companies that used to have research labs, in previous downturns they told their labs to focus on doing something incremental, to fill gaps in their product lines,” says Andrew Herbert, managing director of Microsoft Research Cambridge.

Despite the economic downturn, Microsoft views research as critical to its future. In fact, it says that pure research is especially important during downturns.

“I think of research as one of the things that we have to do and elect to do in order to ensure we survive over the long term,” Craig Mundie, Microsoft's chief research and strategy officer, said early last year at an annual research event. Companies that cut research in the face of short-term pressure or never start pure research tend not to last very long, he said. “My belief is the company would struggle to survive and prosper if we didn't have research investment,” he said.

Microsoft's research group, which includes 1,000 people spread across six labs around the world, has a mission of advancing the state-of-the-art in computer science, Herbert

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TREND ANALYSIS

says. It is also tasked with looking at ways that those advancements might support Microsoft products.

Microsoft researchers come from a wide range of disciplines and have the freedom to pursue subjects that interest them, Herbert said. They include psychologists, ethnographers, sociologists, mathematicians, astronomers and physicists.

When asked how he decides what the researchers should focus on, Herbert says: "The glib answer is, we don't." Instead, the goal is to hire smart people and give them the chance to pursue topics they want to work on.

The company has been criticized for not doing a particularly great job turning research projects into products, says Matt Rosoff, an analyst with Directions on Microsoft. "The transfer between research and product groups has been slow at times. They might come up with good ideas but it's not clear how to turn those ideas into products."

Still, he also says that even when Microsoft does find a way to use technologies developed in the research group in commercial products, it doesn't always do a good job talking about it. For instance, technologies developed in the research group ended up in Microsoft's digital rights management products, its SQL Server, and development languages like C#.

Microsoft Research is boasting about its role in developing technologies behind Kinect, the new Xbox product that will allow users to play games without a controller. The Xbox group had done work developing the system that tracks user movements.

In a company like Microsoft, it can be hard to know how much goes toward pure research, Rosoff noted. The last time that Rosoff's firm investigated Microsoft's research budget was 2002, when it concluded that about 5% of the company's research and development budget was pure research. At the time, that amounted to about \$250 million, he says. He estimates that budget has grown now to around \$500 million a year.

IBM Research is survival

When the economic conditions are difficult, the temptation of any large company is to slash its research and development. After all, for most corporations, research does not directly contribute to the bottom line, and given its speculative nature, may never do so.

Still, when the global economy hit the doldrums in 2008 and 2009, IBM shielded its R&D work from budget reductions.

"I've never been pressured to look for places to cut," says Robert Morris, the IBM



IBM technician Asia Dent tests the world's fastest microprocessor. The heart of IBM's new zEnterprise System mainframes, the new chip helps deliver world-record speed (5.2 GHz) as the world's transactions and data continue to grow.

vice president who heads up the company's research in the field of services. For IBM, research is not a luxury or a public relations play; it is essential to the company's survival.

"Many companies are reacting to the current global downturn by drastically curtailing spending and investment, even in areas that are important to their future [while] we're continuing to invest in R&D," IBM President and Chairman Sam Palmisano instructed company shareholders in a 2009 letter. "In other words, we will not simply ride out the storm. Rather, we will take a long-term view, and go on offense."

Since 2002, IBM has increased R&D spending 21%. In 2009, it had spent \$5.8 billion on R&D. The company now employs 3,000 researchers across eight labs worldwide, and is building a ninth lab in Brazil.

Rarely a week goes by without word of some new IBM innovation: In the middle of September, the company announced that it was shipping the world's fastest microprocessor. The week before, Big Blue announced that it invented an optical bus that added another 50% in throughput speed. And the week before that, it announced a virtualization technology that solved the problem of moving live virtual workloads across different data centers.

And some of IBM's inventions have changed the world, even if they sometimes show up in fields far from IT. IBM can lay claim to not only inventing the personal computer, the disk drive and relational database, but also the SABRE travel reservation system, the technique that led to LASIK eye surgery and a blood separator technology used to treat leukemia.

IBM has held the record for most U.S.

Patents issued in a year for the past 17 years—and the recession hasn't slowed the company. In 2008 it received more than 4,186 patents and in 2009 the number had jumped to 4,914. But perhaps the best measure of success is not the number of patents it is awarded, but how well IBM profits from this work.

In fact, IBM has made headway on one of the most difficult problems facing any company investing in R&D: How to turn the research into business. The trick, Morris explained, is to get the business units and even clients involved in choosing which projects to pursue. "We do not build things in the lab and figure out how to transfer them into the field. We're not an ivory tower. We're not a sandbox," Morris said.

Each year, the labs present an outlook report to the IBM chairman suggesting future trends IBM should follow. Analytics, for instance, was highlighted in a report nearly a decade ago. Earlier this year, IBM announced that it anticipates that analytics will generate up to \$16 billion in annual revenue for the company by 2014.

Not surprisingly, the company is investing heavily into areas where it feels the application of IT may revolutionize some field, such as analytics, city planning, health care, biology or energy.

Healthcare is another area of interest to IBM. In July, the company announced that it would invest \$100 million in healthcare technology. The company's Zurich research center is working on what it calls a lab-on-a-chip that could cut the costs of lab testing. This device is actually a small strip that can soak up a sample of blood and detect proteins that are tell-tale signs of viruses and diseases. ■

THE NEW INTELLIGENT ENTERPRISE

The New Role of IT



From the Editor-in-Chief, *MIT Sloan Management Review*

With a Ph.D. in plant breeding and genetics and years of information technology project management, Beth Holmes brings the discipline of a scientist to her role as IT Analytics Lead at Monsanto Company, the seed and crop protection chemical company.

In its essence, her job is to answer questions for the company through exploratory analytics. Her group scopes out high-value targets, does cost modeling, looks at sales forecasting, and uses multiple methodologies to aid long-range planning. These can include testing assumptions about the macroeconomic drivers behind the trends in agriculture. “Understanding the possibilities of things that may happen are really critical to our ability to operate profitably,” Holmes says.

“Five years ago, people would have viewed analysis as almost synonymous with reporting,” she says. But seeing what analytics can do is starting to change what executives ask for. “The work changes the conversation that IT has with the business units,” says Holmes. “It changes the perspective of the *value* that IT brings.”

Holmes spoke about myth-busting, question-asking, and why the simplest solution is often the smartest with *MIT Sloan Management Review* Editor-in-Chief, Michael S. Hopkins.

Ten years ago, executives looked to IT for technical solutions to support business units. Today, analytics has dramatically changed that function, says **Beth Holmes**, IT Analytics Lead for Monsanto. Now IT managers are sought after for the answers they can provide to build competitive advantage and guide strategic decision making.

Continued on page 2

Continued from page 1



You've said that analytics is about the quest for the best set of leading indicators that you can get to inform your business. Have those indicators changed over the last few years?

Yes, and actually, that's part of the evolution of using analytical capability. If you're running models, then of course you have to not only look at the *results* but also at the *variables* that go into those models: what the relationship is between them, and is that relationship behaving as expected. Those relationships change over time, and it's really the ability to *detect* that change that provides companies with a competitive edge.

We make sure that people are educated on the relationships and assumptions that underpin the models — and that we have the capability to monitor those relationships as well as generate the model results.

Do you find that conventional wisdom in the industry is wrong once you bring models to bear on it?

It's definitely very common to both do a little myth-busting and to confirm conventional wisdom. Both things occur on a regular basis. But the bigger point is that even when you either dispel a myth or you confirm conventional wisdom, you have to keep in mind that tomorrow that relationship may change.

How has the IT department's relationship to the company changed?

We've always had a really strong R&D effort, but we're seeing an increasing appetite to use analytical methods in every level of our business. We've essentially found our way out of R&D and into the business units. It's exciting to me to see that, because as business units recognize how they impact one another, there's a feeling

that they need to get more out of their data not just for their own use but for the *interaction* between groups. That's how a group like my team really helps: we can step across and not only help bridge those silos, but also bring new techniques forward and help bring those folks who are already used to doing analysis up on those techniques. It's important that you understand what an analysis is doing for you and to you to use data effectively in decision making.

This work changes the conversation that IT has with the business units that it works with. In some cases it changes the perspective of the *value* that IT brings. We're used to being sought after for technical solutions of a different type — for the software, hardware and service that we provide to support the business units. It's different to be sought after for the *answers* that we can provide.

So how has Monsanto's use of analytics and data changed?

Five years ago, people would have viewed analysis as almost synonymous with reporting. That work is critical, but being able to take the broader view and doing the analyses to support hypotheses that impact the broader view is what's different.

In the end, you need the best information possible for a variety of decisions that range all the way from daily ops to strategic planning. And the level of sophistication that you need to generate analyses differs based on the problem that you're trying to solve. That said, the simplest choice that works is always the best one.

Continued on page 3

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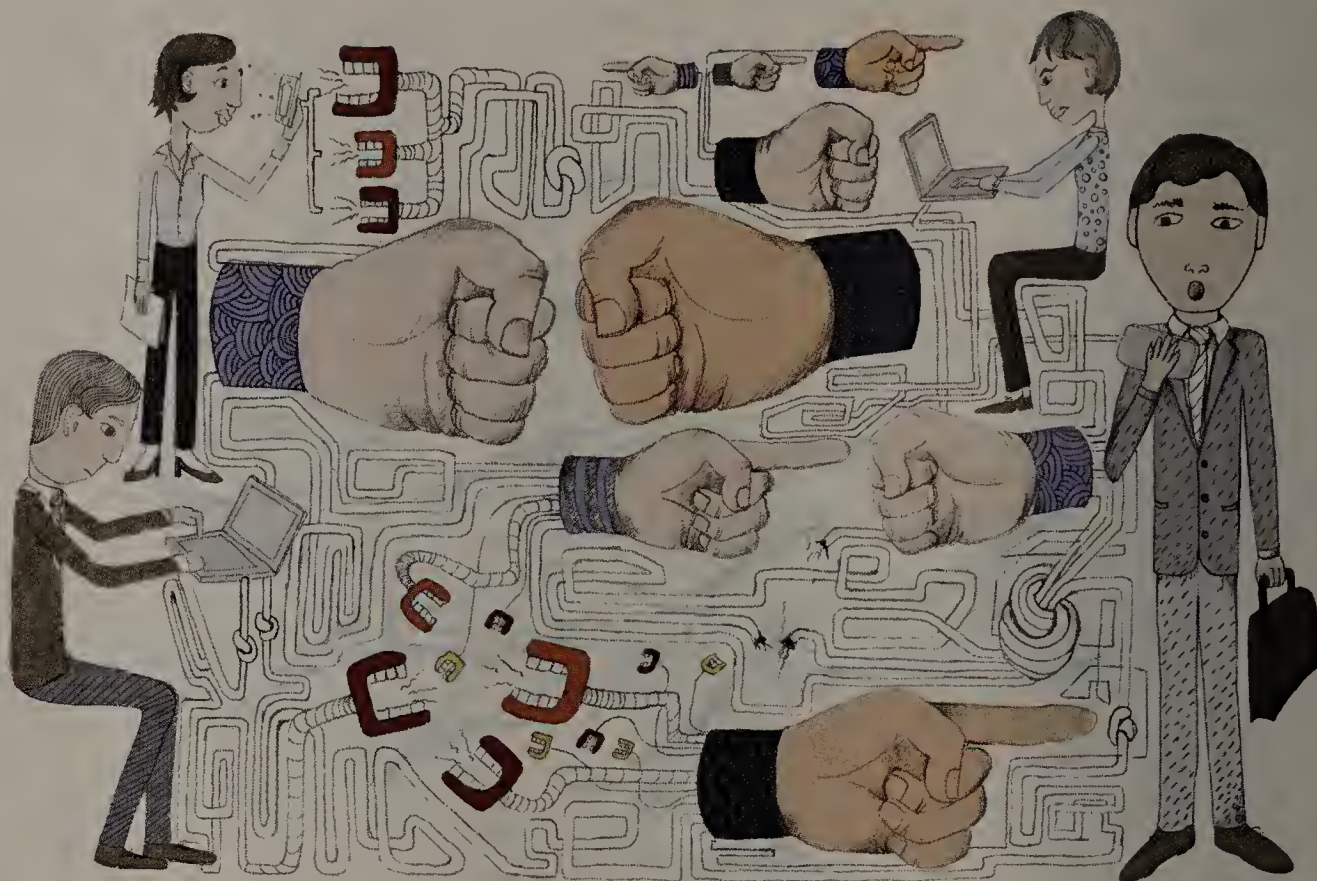


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Continued from page 2

"You need the best information possible for a variety of decisions that range all the way from daily ops to strategic planning."



That's very interesting. How did you come to that conclusion?

In individual solutions, the tendency is to beat the bushes to wring out everything you can. But the efficiency of that solution may not be enough to warrant the effort. So you have to exercise judgment. We do that by always starting with a baseline that's either the existing methodology or the simplest solution possible. We generate that first, and then everything else we do is an effort to beat it.

What has surprised you as you've done this work over the last couple of years?

About two years ago there was a recognition that we're a data-rich company, but to some degree there was still some "sitting on the edge of the pool" in terms of analytics while we were assessing all the components we would need to have in place to bring this capability forward. Our new hypothesis was that maybe you don't need to have *everything* in place in order to start.

We did some work in sales forecasting which didn't really take that much effort, but it really helped our sales organization improve their forecast accuracy early in the season. It doesn't take long to do the analysis, and the return is huge. So our hypothesis was proven out. That's a big learning.

Operationally speaking, the amount of time that we actually spend prepping data versus doing the analysis seems surprising. For the exploratory work, maybe we spend three-fourths of our time getting the data ready

and another quarter of our time selecting the analysis, running it, and interpreting it. But we can complete these projects on a relatively short cycle, and the benefit that is gained in a really short time period is just phenomenal. Using analytics itself to figure out what data elements we need to go after and first making sure that those are correct can narrow the field of high-value targets enough that it's something that people can start to get their heads around and plan for.

Do you think this kind of burgeoning, centralized analytics capability should be housed in IT?

Yes, I do. The reality is that IT has always been a great place to be for perspective into the different business domains. When you underscore that with the implementation capability that being in an IT organization can bring, it is a natural fit.

There are really some great analytical minds at this company in many different business units. They network informally together, and we have both formal and informal relationships with a variety of the people doing analysis all over the company. I would say that the only formal cross-business-unit analytics capability is fixed in IT. However, having a centralized analytics capability doesn't mean it's diminished at the point of need. They augment each other. In fact, we actually accelerate the efforts of others.

Continued on page 4

What database integration means to this blood sample.

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Data visualization showing propensity of different groups of people to buy specific models of cars.

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Continued from page 3

"The best leaders are inquisitive and resourceful in their use of data and the talent to analyze the data, but also decisive and willing to take the action based on data."

In your view, how is the changing nature and availability of information and the changing nature of analyzing it going to alter how companies work? The expectation of having analytical results available to make a decision early on is increasing. As higher quality information becomes available faster, we need to be poised to make decisions faster and take action as well. And I think that means that you have to have some different skill sets available to design and execute analyses.

You can acquire capability in terms of the computational power that's required to generate some analyses. But you also have to invest in the talent within your organization that really understands what the analyses mean and can think about things objectively. The value of having a group in information technology is that they can step back from the individual business units and think about the problems and solutions objectively and in broad context.

We've seen that sometimes people in positions of power don't want to cede their instincts to analytically-driven insights. Have you encountered that?

It's interesting. You see a variety of responses to the group, everything ranging from, "Wow, this is awesome, we needed a group that we could turn to for help with these things," to some self-consciousness and concern about the analytical effort being an evaluation methodology.

We typically get past that by collaborating deeply and closely with the business unit that we're working on a solution for. They learn as they work through these solutions with us, and that improvement in their knowledge base translates out into their organization in a ripple

effect. In the end we don't want to own the model, we want that *group* to own the model. What starts off as fear can become pride of ownership and the ability to work with the answers.

Do you think leaders are going to need to be different, or differently capable, in the age of the new intelligent enterprise?

Leveraging data and analytical capability is an expression of resourcefulness, and it's something that you can't afford to fall behind on. If you don't like math and analyses, then you may try to avoid it to some degree, but you're going to be impacted. The best leaders are inquisitive and resourceful in their use of data and the talent to analyze the data, but they're also decisive and willing to take action based on data. In the transition from intuition-based decisions to data-driven decisions, that's really the huge difference that this capability brings: the confidence to make those decisions. I think the willingness to look at it from that perspective will help leaders be effective.

What impediments do you expect to encounter as these changes become more widespread?

Sometimes we see some hesitation, based on a preconceived notion that people won't understand how you got the answer. We really try to help familiarize people so that they don't walk away from a solution because they're afraid they won't understand how it got there. It's important for folks to realize that while sometimes it requires highly skilled talent to combine analytical techniques to arrive at an answer, everyone — absolutely everyone — is qualified to ask questions. Once people start doing that, they start to lose the discomfort. ■





WikiLeaks is not the actual problem

ANOTHER DAY, another quarter of a million confidential government documents released via WikiLeaks.

This release was particularly well orchestrated, with the first announcements coming a week or so ago. As if to increase the impact, multiple governments went all atwitter, with the U.S. government warning of dire consequences to U.S. diplomacy and the U.K. government going so far as to ask the U.K. press not to publish the material. As the articles in *The New York Times* and the other newspapers that got an advance look at the material show, there is plenty of news in this release. But the underlying story, and lesson, concerns the protection, or non-protection, of U.S. government documents.

WikiLeaks has come a long way, at least in mind share, in the almost four years since I last wrote about it. It has been roundly painted as an evildoer, when, in fact, it can't publish anything it has not been given.

WikiLeaks has been on quite a roll of late. While it has not confined itself to leaked U.S. government documents, it has published quite a few of those — starting with a Department of Defense counterintelligence analysis of WikiLeaks itself. The publication of a video of a U.S. helicopter attack in Baghdad was the first in an ongoing series of large-scale publications of U.S. government documents.

In July, WikiLeaks published about 75,000 pages of documents about the Afghan war, followed by about 400,000 pages about the Iraq war. Just before Thanksgiving, WikiLeaks said that the next release would be seven times the size of the Iraq war release, but the *Times* reports that the initial new release is “only” 250,000 pages, meaning that there are about 2.5 million pages to come.

There has been a lot of press speculation that all of the documents, starting with the helicopter attack video, have come from the same source, a young U.S. Army intelligence analyst who has been arrested. If that is the case, it looks like access to vast databases of secret U.S. government documents was rather broadly available and access was not reasonably logged. None of the documents released to date have been marked top secret, so maybe the database had some level of data segregation. But if news reports are accurate, no log was kept of access to the database or, if such a log exists, it was not regularly reviewed, since suspicion was directed at the analyst by a person outside the U.S. military.

So, it looks like the system is set up to permit low-level people wide access to millions of classified documents without a way to monitor such access, and the system permitted bulk download of these documents.

What would you think if your software development team had put together such a system for your confidential corporate documents? There are lessons to be learned here, not just by the U.S. government.

The surprise about this latest series of leaks is not that it happened, but how it had not happened long before. Actually, maybe it has — not everyone who would like a copy of such information would be interested in publishing it.

Disclaimer: I know of no Harvard opinion on WikiLeaks, or on these disclosures, and I express no opinion here of the correctness of WikiLeaks publishing such documents. But the opinion on document insecurity is mine. ■

Bradner is Harvard University's technology security officer. He can be reached at sob@sobco.com.



What security wrought in 2010

EVERY YEAR, I try to predict the top trends in security for the upcoming year. To give myself a sense of accountability, I always look back at how well those predictions

worked out and either abandon them or double-down for the next year! It's time to test my security predictions for 2010:

■ **Security funding increases by more than 10% to recover from a year of cuts.** Sadly, I was wrong — most companies (60%) saw flat security budgets in 2010, capping a three-year trend of underfunding.

■ **Congress creates new regulatory compliance mandates.** In the wake of the financial meltdown, I expected regulatory compliance burdens to increase in 2010. While HR 4173 (Dodd-Frank) imposes new regulations, the details are left up to several agencies, some newly created and yet to be bootstrapped. Right now, it's hard to tell what will come of those regulations.

■ **Self-propagating mobile phone worms and Trojans.** Internet-connected smartphones with complex and sophisticated software can mean only one thing: self-propagating viruses/worms. Ikee.B is a true self-propagating worm, though it depends on a vulnerable SSH server found only on jailbroken iPhones (plus it was released late in 2009). I'll call this a miss, but I will repeat it for 2011. It's only a matter of time.

■ **Cloud computing providers introduce encryption-at-rest and other security capabilities “as a service.”** I was really hoping this one would come true, partly because we could use such services at Nemertes. Unfortunately, security services are not yet a priority for IaaS providers. Security continues to be the biggest impediment to IaaS adoption. I will also repeat this prediction for 2011.

■ **Desktop virtualization grows.** Citrix and VMware have both pushed desktop virtualization, streaming and Type 1 hypervisors very strongly this year. I will call this a win!

■ **The FBI issues tens of thousands of security letters to get records on individuals without warrants.** On top of national security letters and eavesdropping, both unchallenged and unreformed by the Obama administration, we now have “don't touch my junk” to add to the epitaph of the 4th amendment. Maybe I should predict warrantless cavity searches for 2011? At least there's one area where bipartisanship rules: Both parties think our privacy is not worth much at all.

■ **Real ID dies a deserved death and is abandoned.** It appears that with Nevada backtracking on implementation, and other states opting out, Real ID is truly dead. No one has attempted to resurrect it in this Congress, so perhaps sanity has prevailed. A successful prediction.

My last prediction was sarcastic in nature. I said, “The Transportation Security Administration stops wasting billions of dollars in traveler delays by confiscating water bottles and removing shoes. Instead it focuses on real threats based on rational risk assessment, not security theater based on movie plots. ... OK, unlikely, but I can dream, can't I?”

That dream was rudely interrupted when it “met resistance” during an “enhanced patdown” at IAD after I opted out of unnecessary, melanoma-causing radiation exposure.

Total score: 3.5 out of 7. Let's hope I do better in 2011. ■

Antonopoulos is a senior vice president and founding partner at Nemertes Research, an independent technology research firm. He can be reached at andreas@nemertes.com.

► CAT, from page 1

across seven sites, but with the urging of his CEO — an open source fan — he went ahead with the project anyway.

The software itself was free, but network prep, peripherals and a tech to handle the project full-time all came with a price tag. Overall the savings and the flexibility to add new custom capabilities make the choice seem obvious in retrospect, says Scott McCrea, CIO for the firm, which is a statewide dealership for Caterpillar heavy equipment.

"They say nobody ever got fired for choosing IBM or Cisco. That can be true about choosing Asterisk," he says.

McCrea may be a pioneer by choosing the open-source platform, but it's hard to say. The down economy hit PBX sales hard — down 25% in 2009 — says Matthias Machowinski, an analyst with Infonetix, and they have yet to recover. The crunch likely pushed more businesses to at least consider free alternatives.

Measuring the number of CIOs like McCrea who are willing to download, learn, deploy and support the open-source PBX code is hard because the only number tracked is downloads. They've been steadily growing, according to Digium, the company that oversees the free version of Asterisk and sells enhanced, supported versions. But downloading the software doesn't mean it winds up in production networks.

A controversial report last year estimated Asterisk and other open-source PBXs held an 18% marketshare among PBX vendors in North America. The study by Eastern Management Group projected that use of open-source PBX software would grow by 40% this year.

Still it's not easy to make the leap away from communications platforms by solid vendors like Avaya, Cisco, ShoreTel, Siemens that have products and migration plans in place for customers to transition from traditional voice to unified communications that blends in video, chat, e-mail, conferencing and collaboration.

McCrea says a concern was whether Asterisk could scale large enough to meet Michigan CAT's needs, so he initially bypassed it and spent six months evaluating IP phone systems from Avaya (the company's incumbent PBX vendor), Cisco, ShoreTel and Siemens.

Estimates for them came in at \$350,000 to \$450,000 for hardware, software and network upgrades. In January McCrea's CEO Jerrold M. Jung pushed him to take another look at Asterisk. The company was already developing an ERP system based on open-source components, and he thought an open-source IP PBX might be a good fit, McCrea says.

Talking to other Asterisk users convinced

Using Asterisk isn't a slam dunk

When Michigan CAT considered using open source Asterisk software for its PBXs, CIO Scott McCrea had to weigh the advantages against the possible downsides of straying from traditional, commercial vendors. Here are some factors to consider:

Pros

- No cost for the software
- Lower hardware costs (off-the-shelf servers)
- More features than end-of-life legacy PBXs
- No service contract
- Supports SIP trunking

Cons

- No service contract, requiring in-house or third-party support
- Relies on open-source community for feature development
- No formal upgrade path to unified communications
- Might not scale as large as needed

him Asterisk would scale, so he decided to hire John Laffey to shepherd it through and stay on to expand its capabilities over time.

Laffey says his first task was to familiarize himself with the Avaya system and how it was used at the seven Michigan CAT sites. He spent a couple of months learning that and the interoperability between the Avaya system and Asterisk so he could plan the cutover, and set up project management tools to help break down the transition into tasks.

He also worked with the firm's network manager to identify infrastructure needs to support VoIP as the old TDM phone system was shut down. That required upgrading to power-over-Ethernet switches to run the Polycom phones the company bought to support Asterisk as well as an IOS upgrade to Cisco routers to support a voice virtual LAN and quality of service.

He also laid in HP ProLiant servers provisioned to support Asterisk, as well as PRI and FSX cards to connect to phones and the old PBXs. He then went about configuring Asterisk to emulate features of the Avaya system that were essential such as routing of calls by auto attendants and setting up voicemail.

In purchasing Session Initiation Protocol (SIP) trunks from Sprint to replace traditional AT&T T-1s, individual lines and Centrex services that made up the old phone network, Michigan CAT discovered bandwidth was over-provisioned. By replacing the AT&T connections with equivalent sized SIP trunks, the company is saving 40% because SIP trunks cost less.

But he could get an additional 5% to 10% savings once the links are sized appropriately for each site, McCrea says. Some of the company's phone traffic is seasonal, so tuning the SIP trunk contracts to allow bursting may further savings, he says.

Hardware and network upgrades for the Asterisk project came to \$150,000, which includes phones, network upgrades, servers, trunk cards and line cards. Even with Laffey's salary tacked on, McCrea projects an 18-month return on investment based on reduced costs.

Beyond savings, Asterisk is already providing richer features than the aging Avaya system it replaced. Call records are more detailed, making it possible to keep track of how many calls go unanswered for a certain period and then to design routing schemes to distribute calls to different sites if the wait is too long.

That monitoring will also let him know if a site's phones go down, and he's arranged with Sprint to automatically switch calls to other sites when they do. If the problem is with the Asterisk server, the company has preconfigured standbys that can be driven to the downed site to get it back online.

This is a step up from the old system where outages generally resulted in finger pointing between AT&T and Avaya for half a day.

Receptionist workstations display more information about calls than was available via Avaya receptionist consoles, and the new system distributes visual voicemail as e-mail notifications with audio attachments.

Down the road, the company plans to integrate the phone system with its ERP system. That will give contact center agents screen pops of customer histories as calls come in and enable the routing of calls to the same agents that customers talked to the last time, he says.

CAT distributorships are generally family owned and the IT departments in different states share experiences, McCrea says, including knowledge about their phone systems. Most of his peers use Cisco phone systems, but he's looking forward to showcasing to them what he's done with Asterisk in Michigan.

"When I told them, I got a lot of cross-eyed looks," he says. "We've shown you can get this done fairly inexpensively and without fear." ■

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Sorting Through Rich Internet Apps.

Find out what you need to know about Rich Internet Applications (RIA) in this whitepaper authored by Forrester Research. Key questions such as what is the acceptable use of RIAs by other companies and how aggressive companies using RIAs, are addressed here. Download this whitepaper now.

Spotlight Story**IBM + Sun: How a merger would affect IT***By Jon Brodtkin*

The IT industry is abuzz with the rumor that IBM is going to purchase Sun for nearly \$7 billion, first reported in the Wall Street Journal. It's all speculation until a deal is confirmed, but the combined reach of an IBM/Sun company would be vast. Here are nine topics to consider.

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browser again raise questions about what the company hopes Chrome will accomplish. Is Chrome merely a browser, or is intended to be something more important?

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TOOLS

Snagging YouTube videos and the Rasterbator

If you want to download video from YouTube there are several potentially good tool choices. I say “potentially” because all the tools I’ve tried seem to have problems; I have yet to find a download tool that works flawlessly.

I just got a press release for a download utility called YouTubeGet that I have yet to test, but I’m writing about it because it’s currently on a free promotion until Dec. 10. The company claims it has

sold 100,000 copies of the tool for \$29.95 each.

YouTubeGet, which works with Windows 2000, XP, 2003, Vista, and 7, allows you to save video from YouTube and convert it to MP3, WMV, AVI, MOV, 3GP and other common video and audio formats. Check it out and let me know what you think.

While we’re talking about things visual, have you ever wanted to enlarge an image to, say, the size of a wall? Should this be a hidden desire of yours, there’s a problem: The image’s resolution may not be high enough to allow it to look good when it’s hugely enlarged.

For example, if an image is 1024 pixels wide by 768 pixels tall, then enlarged to 5 feet high it would be, proportionately, 6.67 feet wide. The pixel density would then be just 12.8 pixels per inch (ppi) which is coarse and, of course, the smaller the original image, the lower the ppi and the lower the quality of the final result.

If you printed the image at that resolution you’d just have big smears of color. There is, however, a better way: Rasterizing, or rather, re-rasterizing.

This isn’t normal rasterization, which takes a vector image and converts it to a grid or raster (from the Latin ‘rastrum’ for ‘rake’ derived from ‘radere’ which means ‘to scrape’) made up of spots of color. No, this process involves scaling a small raster to make a bigger raster that looks good.



Mark Gibbs’ Gearhead

Enter the amusingly named Rasterbator, created by one Matias Ärje in Helsinki, Finland. It does exactly that job.

The Rasterbator, which is built on top of .Net Framework 1.1, doesn’t require installation — you just download the software, unzip it, and run it.

You select a source image, the paper size, the paper orientation, the size of the rasterbated poster you wish to create, whether to draw a cutout line around rasterbated area (for printers that don’t support borderless printing), the dot size to use, the color mode, and the output file name.

The default color mode is black, and selecting

that or any single color will result in the software outputting different sized dots according to the brightness at each point of the image.

There’s also an option for “Rasterbate on low priority” so that the software doesn’t suck up all of your machine’s processing power.

Now you click on the “Rasterbate!” button and *voilà!* The Rasterbator produces a rasterized image that you can print out using a PDF reader. Then, if your printer doesn’t do borderless printing, you trim off the margins and stick the pages on the wall.

Just think of what you could do! As you turn the corner into the data center you’re confronted by what looks like the entrance to Hell. Or maybe the wall at the end of a corridor looks like it has a hole in it, and you can see fields and hills in the distance.

If you produce something cool with the Rasterbator, take a picture (of the picture) and send it to me. The Rasterbator gets a rating of 5 out of 5! ■

Gibbs has image issues in Ventura, Calif. Vector your thoughts to gearhead@gibbs.com.



The Rasterbator can enlarge an image to wall size without making it look smeared.

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Reach out and TouchCam someone



THE SCOOP

FV TouchCam N1

by FaceVision, about \$120.

► **What it is:** The FV TouchCam N1 is a high-definition Webcam capable of supporting 720p resolution for video calls (not just across a LAN, but over the Internet). The camera is certified by Skype for its HD video calls, and includes hardware encoding of the H.264 protocol (instead of relying on the PC's CPU). Other features include a 78-degree wide angle lens and dual built-in microphones for better sound quality.

► **Why it's cool:** While you may have a Webcam built into your new notebook, it most likely doesn't offer the 720p support, the dual microphones (you'll end up needing to use headphones for good call quality), or the wide angle lens that the N1 offers. If you videoconference a lot (or if you want to start making more video calls), the N1 offers an upgrade from the standard built-in Webcam.

The wide angle lens is very nice for video calls with multiple people, so they don't have to scrunch next to one another in order to be seen on the video screen. The design of the N1 is also very nice — the brace



Keith Shaw's
Cool Tools

can easily attach to the top of a notebook screen or a flat-panel monitor. The camera and USB cord are also small and compact enough to pack inside your travel bag (but be careful not to scratch the lens, since the camera doesn't come with a travel pouch).

We had two units to test, and when both N1s were connected, they offered a great video call and awesome sound. I then switched to a built-in Webcam on a notebook (a 1.3 megapixel camera), and both the sound and video quality on my end went down. On the upside, I could still see and hear the caller (who was using the N1) just fine. Your best bet would be to buy two cameras and give one to the person who you want to call the most.

► **Some caveats:** The camera currently doesn't support the Skype Mac client or iChat, so Mac users are out of luck. For two-way 720p calls, both users need broadband upload and download speeds of at least 1.2Mbps. Skype users also need to upgrade to Version 4.2 or newer before installing the cameras.

► **Grade ★★★★★ (out of five)**

THE SCOOP

Swiftpoint Mouse

by Swiftpoint Ltd., about \$70.

► **What it is:** This very tiny mouse is designed for notebook users who don't want to carry around a traditional travel mouse, and those who can't stand notebook touchpads. The Swiftpoint Mouse is small enough that you can use it on your laptop itself — in the area below



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The power saved and performance gained, respectively, running Windows Server 2008 R2 on a new Energy Star qualified server compared to Windows Server 2003 SP3 on a 3-year-old server.

SOURCE: MICROSOFT

the keyboard and to the side of the touchpad. And because of the way it's designed, it feels like you're using a pen, not a mouse.

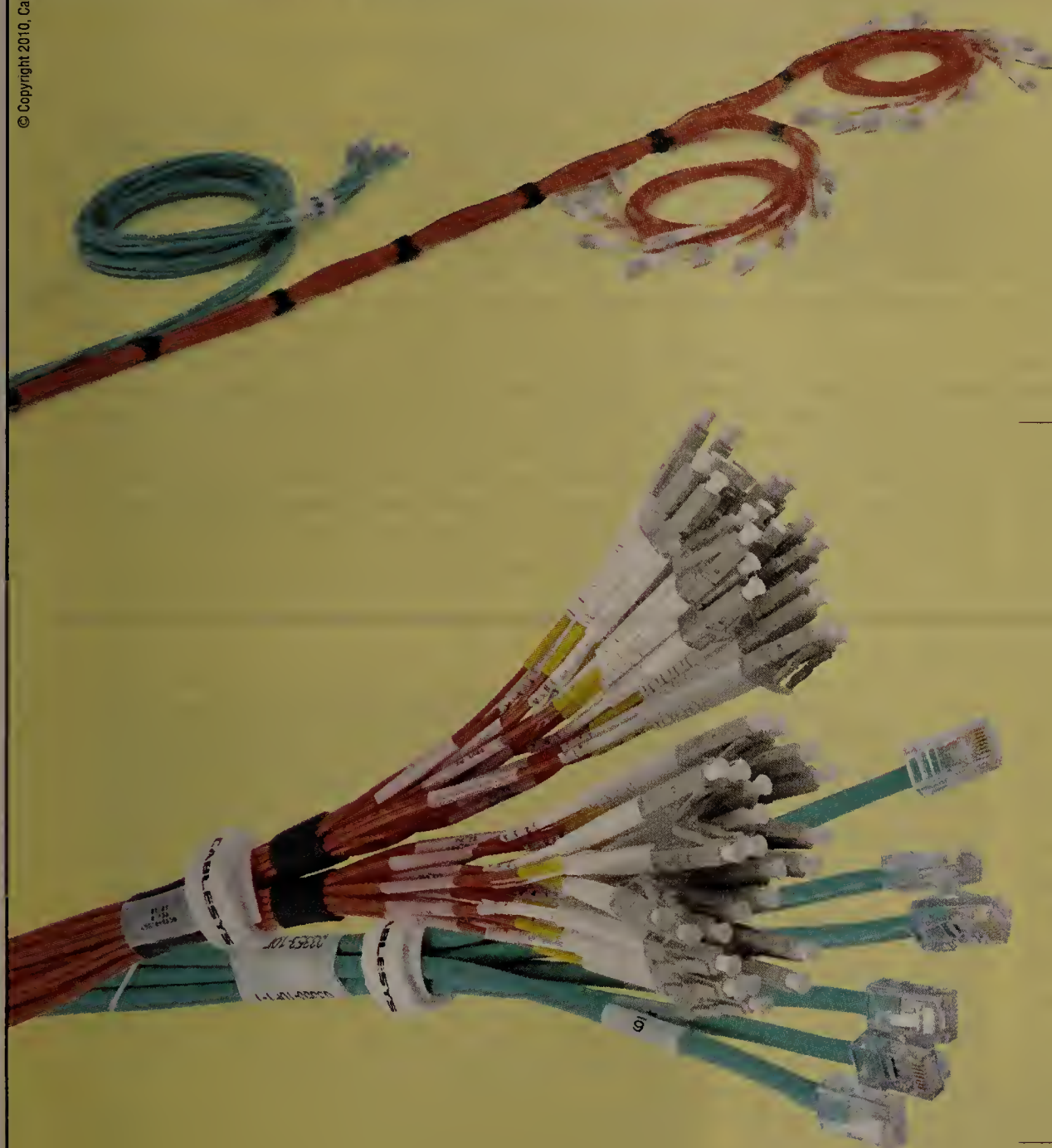
► **Why it's cool:** The extremely small size makes it perfect for mobile workers — you can leave the USB receiver in the slot and it won't break. Moreover, the dongle has a magnetic port that recharges the mouse when it's not being used.

► **Some caveats:** The design of the mouse requires you to change some of your mousing habits. For example, your index finger activates both the left-click and right-click buttons — leaving nothing for your middle finger to do. Scrolling is also different — you need to tilt the mouse to the right and then physically roll the scroll wheel on your mousepad or notebook surface. Using this mouse does take some practice, and you could experience some scrunching pain in your fingers if you're not careful. I would recommend this mouse only if you're using it with a notebook and have limited space for mousing.

► **Grade ★★★★★**

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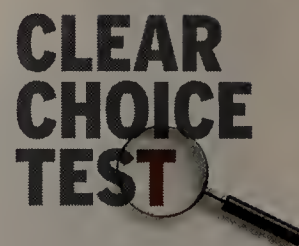
Eight desktop devices that deliver terabytes of shared storage and more

BY JAMES GASKIN

Buffalo shattered the \$1,000 barrier for a terabyte of shared storage back in 2005. With storage prices continuing to drop, that same \$1,000 today can buy a 4TB or even 5TB network-attached storage (NAS) device with RAID 5 disk redundancy, plus additional features, such as backup storage licenses and indexing capabilities.

We tested eight units, each suitable for workgroups in large enterprises or as an entry-level server for small businesses. Our test group included Buffalo Technology TeraStation III, Iomega StorCenter, Netgear ReadyNAS, Western Digital ShareSpace, Seagate BlackArmor, LaCie 5big Network 2, Verbatim PowerBay and the QNAP TS-459 Pro II. We tried to get a unit from Cisco, but its NSS 300 Series Smart Storage units are undergoing a major refresh, and won't be available until 2011.

All of the units support Windows, Apple, and Linux clients, but most demand a Windows PC to execute the initial setup and configuration software, and all units integrate with Microsoft's Active Directory. Beyond basic storage, Buffalo and Iomega offer workgroup document indexing and searching, for free. QNAP leads the way in running multiple applications, many of which require the included MySQL. Hosting a database and applications on a NAS unit has not been possible before. LaCie is by far the most stylish device and it offers five, 1TB disk trays for 3.6TB of usable space. Seagate was the only device to offer software to support a bare metal restore for Windows clients. Netgear was the only product to offer a five-year warranty. Western Digital delivered the lowest price per terabyte. Verbatim offers the ability to use a second box as a real-time replication server.



Western Digital ShareSpace

The Western Digital ShareSpace wins the low-price award for offering 2.68TB of usable space (after disk redundancy and system overhead on the 4TB maximum size) for hundreds less than the other units. The dark silver box looks like a home theater component, and includes media streaming support. It does cut a few corners by using a single Ethernet port and foregoing an information display, but bargain hunters will love this box.

The Quick Installation Guide does a good job, although it hasn't been updated to include Windows 7. One Gigabit Ethernet port joins three USB 2.0 ports; two are on the back and one on the front. When a USB hard drive is attached to the front USB port, a push of the file transfer button just above the USB connection copies data from the external drive to the NAS system. Western Digital sells a large number of USB external hard disks, so give the company credit for making it easy to upgrade to a disk-redundant shared storage



NETRESULTS

Product name	TeraStation III (4TB)	StorCenter (4TB)	BlackArmor NAS (4TB)	ReadyNAS (2TB)
Company	Buffalo Technology	Iomega	Seagate	Netgear
Cost	\$760	\$829	\$700	\$875
Pros	TeraSearch indexing app included; software backs up Windows servers, Exchange, MS-SQL databases.	Best information screen, unlimited backup software licenses, text search for stored files.	Bare-metal restore client software included; Wiki server software for internal use.	Five-year warranty; device backup via rsync and secure rsync; easy install.
Cons	Weak password security; no device content backup support.	Weak password security.	Power brick.	2TB unit as expensive as some other 4TB units.

system from a USB disk.

All important features remain even with the low price. Configured with RAID 5 by default, the box also supports levels 0 (striped) and 1 (mirrored drives). Microsoft Active Directory support is included, as is a built-in FTP server.

Default folders on the DataVolume are Configuration, Download and Public. Creating users is a snap for those new to administration, since Western Digital includes a Basic and Advanced Mode for administration, and the icons for both are non-threatening. Users get their own private folder by default, and the security controls for managing user access are as complete as any of the other boxes. The user folders are again placed in the root of the volume, but only users authorized to see a folder can see it in the directory listing. An attached USB hard drive can be managed as a volume just like an internal volume.

Not quite bare-bones, the Western Digital ShareSpace gives quite a bit of storage for the buck. It may be priced for home users, but it does all the important things any small business or department needs.

Iomega StorCenter

A little smaller than average, the Iomega StorCenter ix4-200d unit with 4TB of storage looks a bit more polished than the Buffalo unit, but is still all black. This unit also has two Gigabit Ethernet ports as well as three USB 2.0 ports, and after disk redundancy and system storage overhead, provides 2.71TB of open space. Printers and external disks can be attached to the USB ports.

The information display, about the size of a domino, is the best in the group. White letters on a blue background show time of day and date, the IP address of the unit, and a bar graph of available storage. Free and used



Iomega StorCenter wins points for its information display.

totals are listed in text above the bar graph that shows at a glance how much disk space is used and free. Following the paper Quick Start Guide was simple, and the installation CD includes both the administration software (Iomega StorCenter) and EMC Retrospect Express backup software (both PC and Mac). Unlimited client backup licenses are included, which is unusual. A pitch for Mozy online backup is enclosed, since EMC owns both Iomega and Mozy. Iomega's QuickProtect file level backup software is also on the CD. Time Machine server for Apple client backup is pre-installed. The contents of the Iomega unit can be replicated to another NAS or USB attached hard drive via one touch (to the USB drive) or rsync.

The default shares on the single large volume are Public and Backup. Private user folders, created with new users, appear in the root of the folder, but only the user in question can see their folder. It may look a little messy with all those private folders to the administrator, but users won't see that. RAID 5 and RAID 10 are supported, as is JBOD (Just a Bunch of Disks), giving maximum storage space but no protection against drive failure.

Security must be enabled before adding users, which makes sense. Creating a user is a two-click process

(and typing the name and password), and the second step offers a chance to let other users access the private folders of the new user with an easy radio button interface. Default access is None, but Read and Read/Write security options are available. Speaking of security, Iomega suggests using at least eight characters for user passwords, but no such restrictions are enforced.

Administrators will appreciate Iomega's admin utility with friendly icons and help only a click away. The Dashboard button opens a page showing a pie chart of used and open disk space, and hardware details. Unfortunately, there's room for only a single e-mail address for notifications. Storage quotas are assigned per folder, not username, but restricting a user's private folder gets the job done.

Iomega also supports media services with a screen to manage Torrent downloads and support for photo dumping from cameras (PTP or Picture Transfer Protocol), DLNA AV Media Center and iTunes streaming (aimed at home users primarily). Video surveillance support includes the ability to connect up to five Axis network security cameras and use the Iomega box to store video without needing a PC in the loop. The box is also VMware certified as a storage unit.

The search function in the Iomega box has a nicer front end than Buffalo's, and works just as quickly and accurately. Users of the search utility see the administration utility interface, stripped down to display only Search, Access Shared Storage (that the user has rights to), and Manage Torrent Downloads. One click, and users can quickly search indexed contents.

Buffalo TeraStation III

The TeraStation III that we tested is a black metal box slightly larger than average for the units tested (but not bigger than most two-slice toasters), featuring two Gigabit



ShareSpace (4TB)	5big Network 2 (5GB)	TS-459 Pro II (2TB)	PowerBay NAS array (4TB)
Western Digital	LaCie USA	QNAP Systems	Verbatim
\$500	\$849	\$899 without drives; resellers set loaded price	\$825
Low price.	Stylish design, most usable space, ports for eSATA external drives.	Best admin utility, above average password security, Web server and app software included.	System content backup via rsync over Ethernet link, can configure to trigger e-mail alerts for various types of events.
Only 1 Ethernet port, no information screen.	System contents backup only to attached USB or eSATA drives.	One-year warranty.	Weak security, no default disk access for new users, no information screen.

Ethernet ports and three USB 2.0 ports. The information display screen, two lines of 16 characters each, rotates between showing the time and date, unit IP address for both Ethernet ports, link speed, and the number of disks active. There was 2.88TB of available space on the system after RAID 5 and included software overhead.

Initial startup and configuration was straightforward as we followed the Quick Start pamphlet and also the full manual on the included CD. The box, configured as a Dynamic Host Configuration Protocol (DHCP) client, picked up an open IP address immediately. Most companies like to assign a static IP address to their storage units, and that option appears during the initial setup. After a reboot, all the configuration changes were in place and the unit was fully visible on the network.

Besides the device locator and administration software on the CD, Buffalo includes 10 licenses of NovaBackup Business Essentials Backup software. Unlike most backup software included with equivalent devices, NovaBackup works with Microsoft Windows servers, Windows Exchange and MS-SQL databases. Your existing backup software will work with the TeraStation, of course, if you redirect the storage location on the clients to a folder on the NAS.

A single volume named Array1 contained all the storage space in the TeraStation. Two folders, Info and Share, were created by default. Share is open to everyone, while Info is read-only and includes a copy of the manual in both English and Japanese. Access to folders can be set at the folder level, or by restricting individual users or groups. You can set storage quotas on users. RAID levels 0, 1, 5 and 10 are supported.

Creating users is a simple two-step process: name the user and assign a password, then type the password again for verification. No security best practices, such as a minimum password length, are enforced. A text field asks for User ID, which may confuse some, but the system will assign a number between 1000 to 1999 in order of user creation. If you want to assign your own numbers, you may do so. Users are automatically included in the default group "hdusers," which is handy, and a step many others forego, requiring an extra step to gain the advantages of grouping users for easier administration.

An unexpected but quite nice feature is TeraSearch, which indexes and searches files stored on the unit. You must enable searching for each folder individually (but sub-folders are included), and update indexes manually or set a time for regular indexing. The software

is Web-based and you find the application by putting the unit's IP address in the URL along with a port address. Once configured, the indexing software worked quickly and proved quite handy.

Other goodies include a DLNA (Digital Living Network Alliance) MediaServer, basic print server, BitTorrent server, Time Machine support for Apple client backup, FTP server, and Virus Scanning. You can encrypt the disk with 128-bit AES encryption, but only when reformatting the drive array.

E-mail notification support is better than average, with room for five addresses, and a check list of events that will trigger e-mails. When the system is shut down properly, an e-mail goes out, a nice touch if you manage remote units.

Netgear ReadyNAS

Smaller than the average box in this group, the Netgear ReadyNAS has an information screen that shows two lines of 16 characters reporting the IP address and the free disk space on the unit. There are two Gigabit Ethernet ports and three USB 2.0 ports for external disks and/or printers. It's the only box with a handle so if you need a couple of terabytes to carry around, this will do the trick. And we say "a couple" because the unit included four 500GB disks for 2TB of maximum storage, yielding 1.3TB after the bytes used for disk redundancy and system files are subtracted. 10GB is reserved for snapshots. Most other units include 4TB, but the Netgear price for 4TB breaks our \$1,000 ceiling.

Netgear includes an excellent Installation Guide pamphlet that should help the most hesitant administrator through setup and configuration. When started, the unit grabbed an IP address from the DHCP server, then suggested we reserve that address on the router/DHCP server. It would be more helpful if they offered the static IP screen at that point and included instructions for choosing and setting a static address. Network Time Protocol servers offered by default are from Netgear, not an NTP pool like on most other units.

Setup forced us, as the administrator, to set a new password. Unlike the other boxes, this one offered a password hint and a space for an e-mail address to send that hint to in case you forget. There is room for three e-mail

addresses to receive alert notifications.

By default, the box set up a "netgear" workgroup for simple Windows file sharing. We prefer to use the Microsoft default of "workgroup" but it was an easy change. Shared folders Backup and Media

are created by default. The Media folder could be a busy one, since Netgear markets this family

of storage products to home and home office users. Support for ReadyDLNA, iTunes, and SqueezeCenter for SqueezeBox devices is included.

No client backup software is included, but the NAS unit functions quite well as the destination for your existing client backup software. Backups of the NAS unit contents are done via snapshots to transfer to other locations, using rsync and secure rsync.

Although there is no Public or Document folder for everyone to share created by default, adding one is a matter of a few clicks. Each user automatically gets his own private folder when assigned a password, and you can add recycle bins in the home folders for each user. You can also import users as a group with the properly formatted file. Each user and group can have a storage quote attached.



ReadyNAS features above-average security.



Beyond the excellent Installation Guide, the administrative screens and processes look fairly austere and aren't as intuitive as the first two units. Once configured, few changes are necessary on storage units like this, so this would be an issue that arises rarely.

RAID levels 0, 1, and 5 are supported. This box also supports VMware storage connections. Unlike other units, the Netgear ReadyNAS comes with a five-year warranty.

Verbatim PowerBay

If you think of Verbatim only for the 3.5-inch floppies stuck in drawers here and there, you're just as behind the times as we were. The company still makes plenty of blank media, from floppy to Blu-ray disks, but it also makes a wide range of USB and FireWire desktop drives, and the PowerBay NAS Array in size ranging from 2TB to 8TB. The Verbatim 4TB unit we tested delivered 2.95TB.

A black metal box about average size in the group, the Verbatim unit has two Gigabit Ethernet ports (one for the network, and one for clustering with another PowerBay unit for real-time data replication). Two USB 2.0 ports are available for external drives or printers.

Power Bay sports an eSATA connector for adding more storage or backup.

There's also an eSATA connector for adding more storage capacity or backup.

Such a rarity: a real paper manual is included. The electronic version is on the enclosed CD, as is Acronis Backup software, with five licenses.

Some installation details can be accomplished through the MagicalFinder utility that locates the drive on the network (especially useful with new installations that rely on a DHCP server to provide the box address). You can set the IP address, change the default name (PowerBay) and set the workgroup. It also shows the IP address of the PC running the utility, which is a nice touch.

Oddly, the system doesn't demand an administrator password, which is somewhat lax even in the world of NAS system security. When we did change the password from the default, the only enforcement of good password rules was the need for between five to 20 characters.

Creating users is as simple as supplying the name, password, and group (or don't put the user in a group). Once created, however, the user will have a real shock: he won't be able to access any shared storage on the box.

For some bizarre reason, the default volume, Volume_1, doesn't allow access by users until they are specifically configured with access rights. This is the only unit that makes such a mess of default disk access. Once you fix this poor configuration choice by Verbatim, all is well.

One button on the front of the unit downloads data on any USB hard drive attached to the front USB port. USB ports and the eSATA port can be used to back up the box's data to an external hard disk. But Verbatim does a good thing, and uses the second Gigabit Ethernet port to connect to a second PowerBay to act as a real time replication server for your data. If you prefer your backups be further away, rsync is provided.

E-mail alerts can be sent to four addresses, which is nice. Even better is the checkboxes offered to define what merits an alert. Administrator password change? Check. Get hotter than 145 degrees F? Check. Those and five more events can be easily configured.

It's a shame Verbatim made the default volume out of reach when setting up the system right out of the box. Outside of that big error, everything else works great.

Seagate BlackArmor

With a name like BlackArmor, one expects a no-nonsense device, and the Seagate box certainly delivers. The black metal case, slightly larger than average, has an overhang on the front that reminds us of the lip of a helmet. Yet to cover all bases, this box also includes a media server and iTunes support.

Two Gigabit Ethernet ports are balanced by four USB 2.0 plugs, one on the front and three on the back. Seagate includes 10 licenses of its BlackArmor Backup software for Windows clients, as well as SafetyDrill+ software to support

Bare Metal Restore for Windows clients, the only unit to offer such a feature. Time Machine support wasn't included on

the unit we tested, but a firmware upgrade will add that feature, along with VMware certification.

While only two lines with 16 characters each, the information display screen offers nine headings to drill down using the up and down buttons beside the display. Typical information such as data and time, IP address and device name are expected, but many system details such as temperature and fan status are also included.

BlackArmor delivers no-nonsense storage.

RAID levels supported run the gamut from 0, 1, 5 and 10, as well as JBOD. After data redundancy and storage overhead, 2.7TB of the 4TB maximum storage was available. There's a recycle bin for each shared folder, but recovering files is done through the administration utility. A basic print server is included.

The administration utility is complete and business-like. Menu items are listed across the top, with submenu options stacked on the left side. Clicking the Help button opens a new browser window with the entire manual available, but the displayed page is context sensitive to the utility screen contents.

There are five spaces for e-mail notifications, which is nice. Like the Buffalo TeraStation, the Seagate system sent a notice when shut down. There are no options for when or why to send other e-mail notifications, however. Prepare to be surprised.

When creating users, the Seagate unit gives an option of whether to create a private user share. If the answer is yes, a drop-down list shows which volumes are available to host that share, a nice touch. The default volume is named DataVolume. There's an option to encrypt user shares. Quotas are set by user on each volume, allowing you to restrict a user's storage capacity on one volume but



not another.

One interesting feature is a hosted wiki on the unit. Enabling DokuWiki gives users a chance to create documentation or store public information in an easy format for everyone to see and edit.

LaCie 5big

LaCie has been a major player in the Apple Storage market for years, and its box shows a design aesthetic far more Apple than Microsoft. The largest unit in the tested group, the LaCie is a dark silver color with a golf-ball-sized blue light recessed into the box. The Quick Install Guide names the designer (Neil Poulton) just under the name of the unit, meaning design is far more important than for any of the other units. The fact this looks like modern art rather than disk storage testifies to its success.

The five disk trays each hold a 1TB disk drive. Five disks and five drives mean the usable space is 3.6TB (out of 5TB), a big bump over the other units with only four disks. With larger disks, the unit can hold 7.5TB or 10TB, and it supports RAID levels 0, 5, 5+ and 6 (two drives can die and the data remains safe). Just like with Apple, the manual and included software comes on a DVD, not a CD.

Two Gigabit Ethernet ports are on the back, as are two USB 2.0 ports. Unlike the previous models discussed, two eSATA ports are also on the back, allowing you to plug high-performance SATA drives directly to the box for better throughput than the USB ports. Unfortunately, the eSATA performance is your best bet for backing up the unit contents, since there's no NAS-to-NAS option.

Genie Backup Manager Pro 8 (for Windows clients) and Intego Backup Manager Pro 8 (for Macs) are included, but only three licenses each. As we expected, Time Machine is provided for Apple clients as well.

The two default shared folders are Public and Share, but only Public is open to everyone. Users must be allowed access to Share.

Creating users is straightforward, and each field pops up helpful information as you mouse over it. Private folders are not created with the users. Quotas are set by shared folder, not user name. When you create a folder for a user, you must then go to the Shares screen to allow that user access to that folder. There is

no way to import a list of users at once, but LaCie does integrate into Microsoft's Active Directory, like every other box in this test.

Apple fans will love the LaCie box. Those watching their pennies will love the added extra storage for the same cost as many of the competitors. The Western Digital unit may be the least expensive per usable terabyte based on retail price (\$231), but the LaCie is darn close at \$236 per usable TB.

QNAP TS-459 Pro II

This average-sized box has a black front with a gray metal body. Design goals were functional, not fancy, with the four drives right in the front, and an information display of two lines of 16 characters offering the IP address. When the top control button beside the display is held down for two seconds, the Main Menu appears, allowing quite a bit of configuration functions without touching a computer or administrative utility. We tested with four 700GB drives, which delivered 2.06TB of available storage.

Two Gigabit Ethernet ports on the back are balanced by four USB 2.0 ports and two eSATA ports. A fifth USB 2.0 port on the front is just below a "Copy" button to trigger data imports and exports. Printers or external disks can be connected to the USB ports, while the eSATA plugs only support storage devices. RAID levels 1, 5 and 6 are supported.

The Quick Installation Guide is a folded piece of poster-sized paper with English and 17 other languages. Initial setup is straightforward, but the administrative utility is surprisingly attractive in a fun icon way, with easy navigation. This may be the best looking admin utility of the bunch. One oddity is to make the default workgroup name NAS rather than workgroup. Users can be added in bunches, Active Directory is supported, and disk quotas are set by user.

NetBak Replicator software is included for clients, along with 10 licenses. Data on the QNAP device can be replicated via rsync or up to Amazon S3 storage services, the behind-the-scenes storage destination of many backup providers. Time Machine can be enabled for Apple clients.

There is space for only two e-mail addresses for alert notifications, but you can configure SMS texting alerts as well. Between two e-mail and two text notifications, alerts should be noticed.



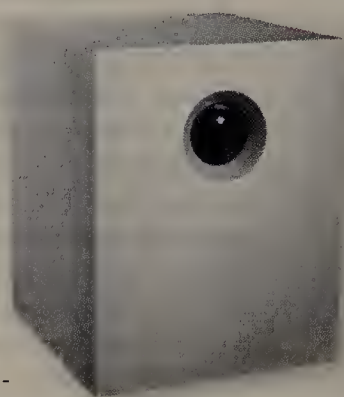
At first, user password security seems no better than the rest of the boxes, with a new user's password suggested to be at least six characters, but not enforced. Digging deeper, however, brought us to a screen where password rigor for users can be upped considerably. You can force users to use three types of characters in a password (choosing from lower or upper case letters, numbers and symbols), stop them from repeating characters more than three times in a row, and block them from making their password the same as their username, or their username typed backwards.

QNAP features the stoutest user security of the group, and easily enforced across the board from one configuration checkbox. In addition to the password rules, ranges of IP addresses can be blocked, or set so only clients within that range can connect to the unit.

Blurring the lines between a NAS unit acting as a file server, and a full application server, QNAP adds in the Apache Web server, MySQL server, Surveillance Station, iTunes server and download station. Plug-ins for the Web server can be downloaded from QPKG, provided by QNAP. Two dozen plug-ins are available, ranging from SqueezeBox Server to the WordPress blogging platform to the vtiger CRM to the Joomla content management system and more.

Whether running a dozen applications on a NAS box is a good idea or not, having the option to add one or two centralized programs without a Windows server, such as the Asterisk Internet phone system software or the XDove e-mail servers, on an inexpensive server platform could be quite handy. ■

Gaskin writes books, articles and jokes about technology from his home-office lab in the Dallas area. Contact him at james@gaskin.com.



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What's in your network?

IPsonar makes quick work of documenting the nooks and crannies of enterprise nets

BY BARRY NANCE

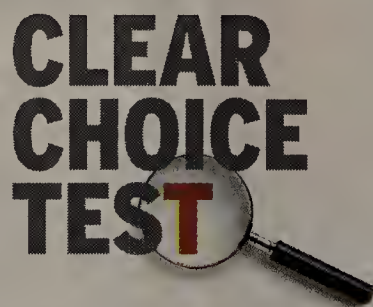
Documenting your network may sound like a mundane task, but it's vitally important for IT managers to keep their network documentation up to date for a number of reasons.

Troubleshooters will thank you when the documentation helps them understand the scope and breadth of a problem. Capacity planners will thank you because they'll have firm ground to stand on when they gauge usage trends and make recommendations. Budget people will thank you for finally giving them an accurate rendering of the network. And the CIO will thank you (and maybe give you a raise) for providing a clear picture of your company's network.

We tested IPsonar, a network documentation tool that Lumeta delivered to our lab pre-installed on an HP EliteBook computer running FreeBSD.

IPsonar is a great concept, and using it to document the labyrinths of a network is certainly far easier than documenting by hand. However, we found that IPsonar could use some interface improvements, a few new reports and slightly smarter device recognition.

IPsonar distinguishes between different types of scans — network, host, service, device and leak — and you can perform multiple types in a single run. A network scan reveals topology and generates network maps. A host scan probes open ports to locate Web servers, database servers and so forth. A service scan identifies specific services (such as FTP, NNTP) running on network nodes. A device scan inventories all the network's nodes, querying for device type and function along the way. If you strategically pepper



your network with Lumeta Leak Sensors, a leak scan finds unauthorized Internet connection points.

IPsonar accurately detected all of the devices and links that we exposed it to on a variety of networks. For managed (SNMP-aware) devices for which we specified good community strings, it correctly identified the purpose, type, manufacturer and other details of each of those devices.

However, IPsonar struggled with unmanaged devices. For example, IPsonar characterized a Motorola 2210 DSL router as a "host" because the DSL router had a Web server (Port 80) interface. IPsonar even declared the DSL router's operating system was either NetBSD or OpenBSD 1.6. IPsonar should have noticed that the IP addresses on either side of the DSL router were different enough to call it a router, not a host.

In the same vein, IPsonar noted a device was manufactured by Cisco, was running the IOS 11.2 operating system and was bounded by dissimilar IP addresses, but, because we used an incorrect community string, IPsonar failed to identify the type of device (it was a router, of course). IPsonar also misidentified a 3Com OfficeConnect 802.11g access point.

We'd like to see IPsonar use smart heuristics to help document unmanaged devices. It might deductively use, for instance, the

presence of disparate IP addresses on either side of a device or specific Maximum Transmission Unit (MTU) values to help determine the nature of a device or link.

We set up a variety of scan configurations, giving each a unique name. For each scan, we specified scan types, IP address blocks to scan (or avoid), SNMP community strings, sensors to use, packet rates and DNS servers (from which to obtain node names).

Another oddity: we could specify time periods in which IPsonar should perform a scan. However, IPsonar didn't let us choose a date/time frequency for actually running scans on a regular basis. We had to manually click a "Start Scan" button each time we wanted IPsonar to scan our network.

Screwy GUI

IPsonar has a Web browser interface. The upper left portion of IPsonar's "home page" — prime user interface real estate — displays, of all things, disk space usage on the IPsonar server, with a large "Update Now" button for bored people who want to see how often the numbers change.

We could also perform a "tactical scan" as well as see the updated-every-30-seconds progress indicators for currently running scans and reports. A tactical scan is a network scan, leak scan, service scan or ping of a specific IP address that you do after fixing something on the network.

The home page also has links to pages for setting up scans, performing administrative tasks and viewing reports.

Choosing the reports link and selecting a report for viewing transports you into another world. The report viewer is an interactive Adobe Flash environment that is, unlike IPsonar's other Web pages, easy to use, well designed and almost intuitive.

Each report display is highly customizable and can include a dashboard, node map, list of nodes, chart of SNMP-aware routers, leak-detection results and a wealth of other information. Click on a node in the node map and it displays several categories of information about that node, and most report displays offer both PDF and format-for-printer options.

Unfortunately, Lumeta doesn't offer the means to combine reports (for example, consolidating Americas, Europe and Far East into one global view) or the means to reveal trends by comparing earlier reports with current ones via statistical analysis.

Outside the interactive reporting environment, IPsonar can be quite unfriendly.

NETRESULTS

Product	IPsonar 5.0
Vendor	Lumeta
Pricing	Starts at \$75,000. Report server is \$50,000, scan server is \$25,000 and a sensor is \$7,500.
Pros	Excellent reporting environment.
Cons	Cryptic messages; unhelpful with unmanaged devices.

SCORECARD

Discovery & Recognition (30%)	3
Reports (40%)	4
Ease of Use (20%)	2
Documentation & Installation (10%)	3
Total	3.2

SCORING KEY: 5: EXCEPTIONAL; 4: VERY GOOD; 3: AVERAGE; 2: BELOW AVERAGE; 1: SUBPAR OR NOT AVAILABLE

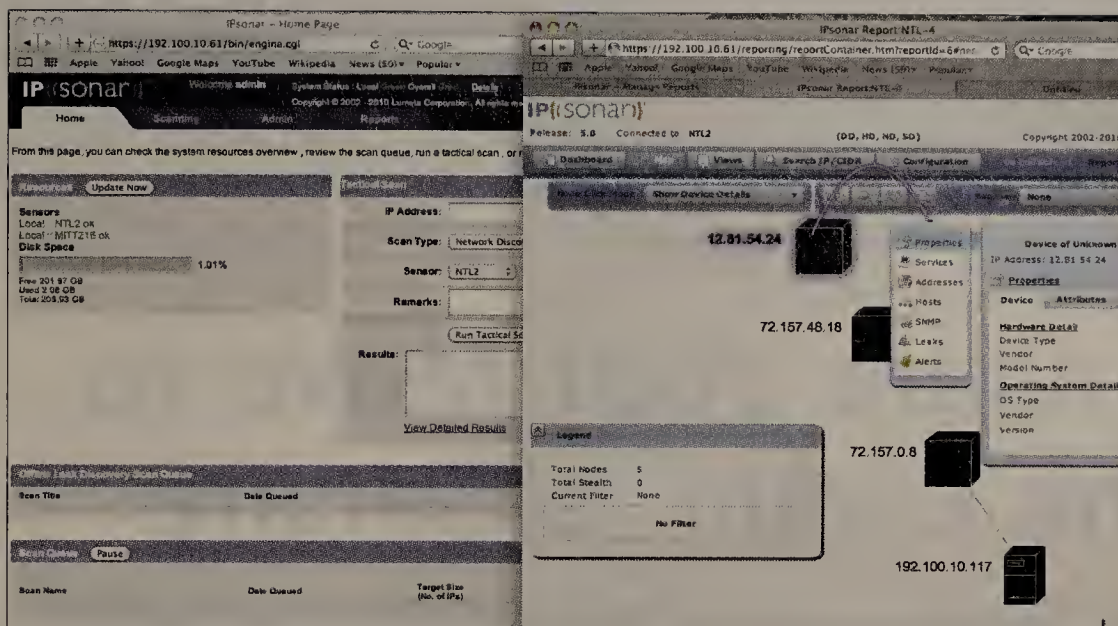
Initiating a scan without specifying a Leak Sensor produced the cryptic message, "Internal Error: Scan type leakDiscovery did not execute." Clicking on a button to get more information about a scan (or other activity) displayed log file entries that were mostly meaningful only to a programmer.

When we asked IPsonar to show its network map after a scan of just the local network, it produced a never-ending "Retrieving Map" display. (Bug cause: IPsonar assumes all scans look beyond the local network). After a few days of testing, IPsonar's internal Apache Web server began displaying "Internal Server Error" messages when we clicked on the home page link. (Bug workaround: We renamed the IPsonar server from "NTL" to "NTL2" and the "Internal Server Error" messages disappeared).

While its online help facility is context-sensitive and oftentimes helpful, IPsonar's Administrator Guide is a PDF file whose contents are, unfortunately, rather obscure.

Conclusion

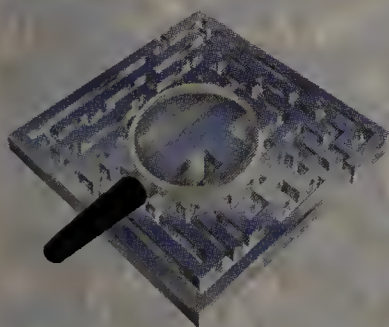
IPsonar is a study in contrasts. While it



A study in contrasts – IPsonar's reports (right-hand browser window) interactively and creatively use Adobe Flash, but its main window (on the left) is poorly designed and awkward.

certainly can ease the work of documenting a network, IPsonar's user interface issues and lack of "smart heuristics" detract from its highly creative reporting environment. ■

Nance runs Network Testing Labs and is the author of *Introduction to Networking, 4th Edition* and *Client/Server LAN Programming*. He can be reached at barryn@erols.com.



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BACKSPIN | BY MARK GIBBS

Microsoft routes around its own COICA damage

WELL, WHO would have guessed? A big “thank you” to Microsoft is in order. Just one week after I chose Microsoft as the recipient of this year’s Gibbs Golden Turkey Award for being all heavy-handed and ^%\$ish about hackers creating open-source drivers for Microsoft’s Kinect controller, the company goes and reverses its position.

After the hack, Microsoft said it was going to “work closely with law enforcement and product-safety groups to keep Kinect tamper-resistant,” which sounded pretty threatening. But when CNN interviewed two Microsofties after the incident and asked, “So no one is going to get in trouble?” The reply was, “Nope. Absolutely not.”

Asking whether anyone would get in trouble reveals that CNN had the rather strange idea that somebody *could* have gotten into trouble. What’s more ridiculous is that the Microsoft people didn’t say that the idea of somebody getting into trouble over writing drivers for the Kinect was nonsensical (which it is); they simply said trouble wasn’t going to happen, which sounds pretty arrogant.

What Microsoft is doing in this case is very Internet-like: The company is routing around the damage — of course it’s their own damage, but the principle still applies.

The idea of routing around damage comes from a quote from John Gilmore, a famous computer scientist and a founder of the Electronic Frontier Foundation. Gilmore said, “The ‘Net interprets censorship as damage and routes around it.” The same can be said for any kind of damage to the online world: The ‘Net is a living thing, which means it is adept at self-preservation and recovery from injury. This is something that politicians and anyone who would attempt to remove First

Amendment rights would do well to remember.

Here’s a case in point: The passing, in unseemly and ill-considered haste, of the Combating Online Infringement and Counterfeits Act (COICA) that allows the effective shutting down of Web sites alleged to be involved in music and or video piracy. As I have discussed in other columns, the way the Justice Department plans to do this is by requiring ISPs to stop resolving domain names to IP addresses.

The most disturbing thing about COICA is that it essentially short-circuits due process, becoming a powerful vehicle for censorship. And what did Gilmore specifically reference? Yep, censorship.

We’ve seen efforts in China and other parts of Asia, where restrictive and despotic regimes have tried to rein in the influence of the ‘Net. It hasn’t worked; the ‘Net just recovers and carries on.

The passing of COICA has many people worried about what it might mean in practice, and they’re already talking about solutions for minimizing the bill’s consequences. One of the coolest responses comes from Peter Sunde, a co-founder of the infamous Pirate Bay. Sunde has started a project to create a decentralized DNS system based on peer-to-peer technology. Potentially, everyone could own the DNS system.

But what is so interesting is that the environmental pressure of idiotic bills like COICA and other misguided efforts will, in the long run, make the Internet stronger and more robust.

We should give thanks that Microsoft has seen sense and that we’re being forced to improve the ‘Net. ■

Gibbs is, once again, thankful in Ventura, Calif. Send your alternative choice for the Gibbs Golden Turkey to backspin@gibbs.com.



NETBUZZ | BY PAUL MCNAMARA

The single greatest career move in history

CHANCES ARE no one has heard Eric Schmidt muttering under his breath, “Dang, I could have worked at Attachmate.”

The thought arose as I compiled a Novell corporate timeline to accompany our online coverage of its recent acquisition by Attachmate. Schmidt was CEO at Novell in 2001 when he was offered and took the top spot at Google. The rest is history, and has prompted me to wonder over the years: Has anyone in any field ever made a better career move?

I say no. You say, Who wouldn’t rather run Google than Novell?

You’re thinking 2010 Google, the one whose stock price is sniffing \$600, good for a market cap of some \$186 billion. In 2001, the wisdom of Schmidt’s decision was not so readily apparent, even though Novell had seen its best days, and, while a mere three years removed from the Stanford dorm room of its founders, Google was already being used as a verb by the more tech savvy.

I distinctly remember thinking, “Google? Schmidt? Really?”

My bad. But I was thinking of 2001 Google, as were a whole lot of other journalists.

The *Wall Street Journal* noted that although Google was attracting 50 million unique visitors a month, Yahoo was garnering four times that and wasn’t exactly making a mint.

“Google’s basic business model remains questionable. Because Google doesn’t offer banner ads or other general advertising displays on its Website, it must rely on discreet ads that are supplied only when users search for specific key words. These so-called sponsor links are text-only and are highlighted in different colors to distinguish them

from search results.”

How could anyone build a business around those itty-bitty ads?

In fact, one of Schmidt’s first moves as Google CEO was to assure one and all that the company was in the black. “We are quite profitable,” he said. “We are not talking about 1%.”

In the *San Francisco Gate*, Schmidt basically gushed about the financial situation he inherited: “People say, ‘Google, interesting technology, wonderful brand, but how do you make money?’ The founders, in their inimitable way, have managed to build a company that was profitable in the March quarter in a cash flow basis, and in June, we were profitable on a [generally accepted accounting principles] basis. It’s amazing, but even in the summer, which is traditionally slow from an advertising perspective, it looks like we will continue this fine performance.”

Think they worry about summer doldrums now?

Keep in mind that this was 18 months after the pop of the dot-com bubble and there were those who viewed Google as just another eyeball-aggregating, revenue-light suspect.

When it was suggested to a *Forbes* writer that “search is the second most popular activity on the Web — it would be absurd to think businesses can’t make a profit off it,” the writer replied: “We’ll believe it when we see it.”

Bet he believes it now. Bet Schmidt believed it as he cleaned out his desk at Novell. But I also bet he didn’t see himself being worth \$5 billion. And I guarantee he never thought he’d just made the single greatest career decision in the history of gainful employment. ■

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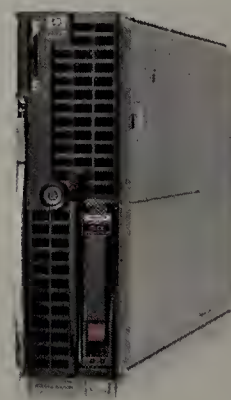
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